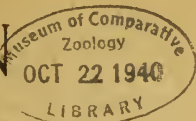


BULLETIN



OF THE

NATURAL HISTORY SOCIETY

OF

NEW BRUNSWICK.

No. XXXI.

VOL. VII. PART I.



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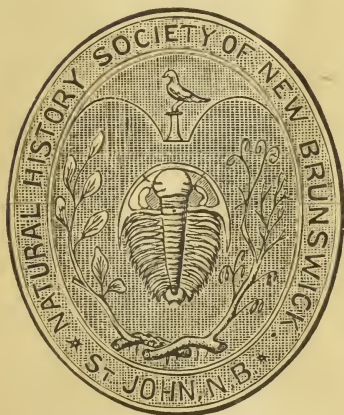
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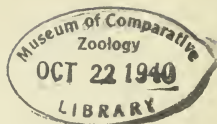
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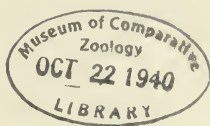
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NOTES ON THE NATURAL HISTORY AND PHYSIOGRAPHY OF NEW BRUNSWICK.

BY W. F. GANONG.

128.—FURTHER DATA UPON THE RATE OF RECESSION OF THE COAST LINE OF NEW BRUNSWICK.

Read in Abstract June 10, 1913.

In Note No. 119 of this series, I gave the results of measurements made to determine the rate of recession of a piece of coast line on our North Shore. While the Note was in press it occurred to me that additional, and probably (because involving a longer period, of time) more exact, data might be yielded by a re-survey of two places which I had mapped fifteen years ago; and accordingly I visited those places in the summer of 1912, with results which follow.

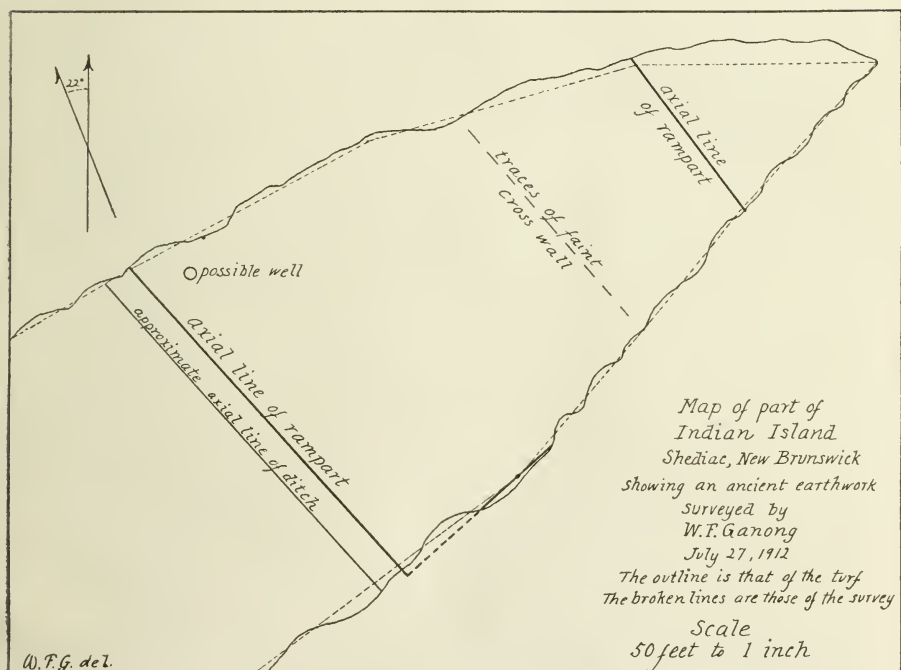
The first of the places was old Fort Monckton at Baie Verte, the ruins of which have long been in process of erosion by the sea. My map of the Fort, showing the position of the encroaching shore line, was made in 1897, and was published in the *Transactions of the Royal Society of Canada*, V, 1899, ii, 290. On my visit in 1912, however, I found that while a considerable part of the point in front of the Fort, composed of loose drift, has been washed away, there has been no measurable change in the condition of the ramparts of the Fort. The explanation thereof is, however, fairly apparent, for the actual works of the Fort here rest upon sandstone ledges which rise above the highest tides, so that the loose soil can only be removed for the future in proportion as the ledges are first eroded away; and this, of course, will proceed but slowly. Furthermore, the erosion of the point, and also of the northeast corner of the rampart, has been

stopped for a long time to come by the construction (in 1911 I was told) of a strong concrete retaining wall, designed to protect from the waves the remnant of the old burial ground and also the foundation of a new lighthouse.

My expression "no measurable change" is used for a definite reason, namely, that while I am sure there has been some erosion of the rampart at the northeast corner and in one place along the eastern side, my original plan, made with no thought of this use in mind but merely to fix the general position and surroundings of the Fort, is too generalized to permit its use for any measurements of small quantity. Indeed in one way it is a little misleading, for it does not show some part of the outer slope of the ditch which still exists; and this fact must be held in mind in any observations of this kind in the future.

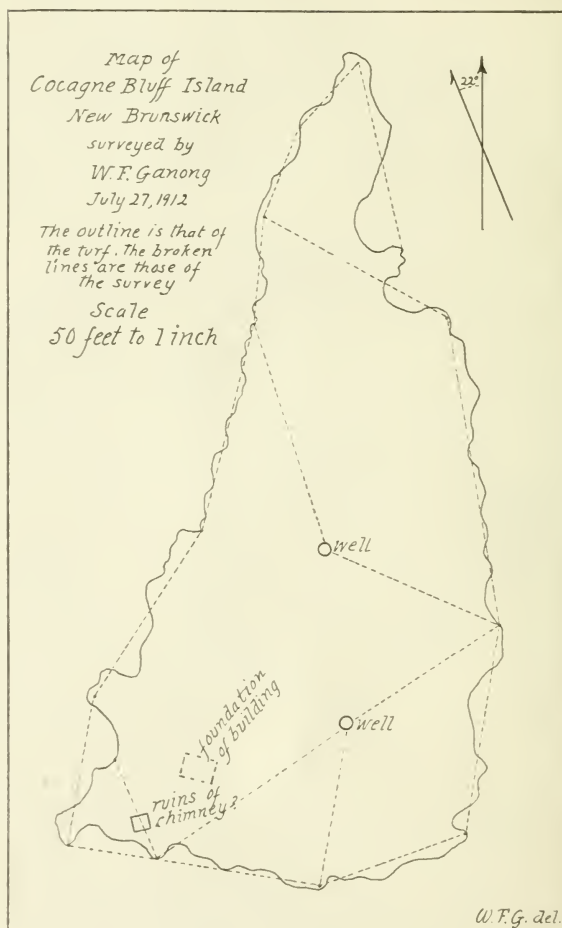
The second of the places in question is Indian Island in Shediac Harbour, a little, elongated, upland, flat-topped, bush-covered, abrupt-banked, glacial-gravel island, containing on its northeastern end the remains of an old defensive work. My first map was made in 1897, and was published in the above-mentioned *Transactions*, page 293. Unfortunately, however, in this case also my map was too generalized for use in exact studies, though it does show clearly, when compared with the accompanying new map made in 1912, that several feet have been removed from the southern side, while the southern angle of the work, perfectly distinct in 1897, has now completely disappeared. Since the island is composed solely of gravel, except for a little rotten ledge in one place, the erosion by the sea must naturally proceed far more rapidly than in the case of Fort Monckton, despite the fact that its position within Shediac Harbour shelters it from the heavy seas of the Gulf. Being practically valueless for any economic purpose, it is likely to remain long undisturbed by any operation of man more extensive than picnicking or money digging; and accordingly it affords, in view of the presence of fixed marks offered by the low walls or ramparts, an excellent opportunity for a future

measurement of recession. For this reason I made a new and careful survey of the island, using surveying compass and tape, and giving especial attention to the relation of the existent works to the edge of the upland of the island. This map, which I know is accurate to within a few inches, is presented herewith, in the full belief that future students will find it of service in this connection.



The importance of establishing accurate bases for future measurements of coast recession became so evident to me during my trip along this coast in 1912 that I kept continually in quest of other suitable places, of which I found one that is nearly ideal. It is the little flat island, called locally Cocagne Bluff Island, which stands out very prominently between Cocagne and Buctouche, and which, because connected

with the mainland by a bar, is marked on the maps as a point,—the Dixon Point of the Geological map. The island consists of a foot or two of soil bearing a close turf, resting



upon flat ledges which come two or three feet above high tide. As in case of Fort Monckton, the upland can be removed only in proportion as the ledges are eroded, on which account its recession will be slow despite the fact that

it is exposed to the full force of the storms of Northumberland Strait. It contains two wells and some foundations (those of a former lobster factory, I have been told), which afford a fixed basis for measurement, and being too small to be of any further economic use, is likely to remain for the future undisturbed. Accordingly I made a survey of this island, accurate to a very few inches, and the map is presented herewith, for precisely the same use as that of Indian Island. I tried in vain to find another island or point, containing fixed marks and composed of gravel, but exposed to the sea.

For completeness of the subject, I would refer again to the map accompanying Note No. 119, and call attention to the fact that about four years ago the late Professor Penhallow established mark posts on Dohet Island in the Saint Croix River for exactly this same purpose. The results will no doubt be recorded in due time by the Biological Station at Saint Andrews.

129.—THE PHYSIOGRAPHIC CHARACTERISTICS OF LAKE STREAM, QUEENS-KENT.

In my earlier Note upon Salmon River (No. 126, page 440), I gave some account of Lake Stream, the largest branch of that river on the south; but this was wholly from report of others, since I had not then examined it myself. In August last, however, I descended it in a canoe from its source and made the observations which follow.*

Lake Stream flows wholly in the soft sandstone of the Eastern Plain. The source is formed by two lakes in Queens County, as shown by the map. They lie a little higher than the railway, with which they are connected by a good portage

*I was accompanied by my friend Mr. Leonard Smith of Grangeville, Kent County. We took our canoe and outfit from Chipman along the newly-opened Transcontinental Railway, and portaged in to the Upper Lake. After our descent of the Stream and Salmon River to Chipman, we went out by the railway again and descended Coal Creek, and returned by Grand Lake and Salmon River once more to Chipman. Then we took the railway a third time to the crossing of the North Fork Canaan, which fine stream we also descended.

In connection with this note I have had much information from two men who know the stream well, Mr. Wilson Jonah, and Mr. Thos. MacEacheron, both of Chipman; and to them I wish here to tender my very best thanks.

road of less than a mile length, (compare the map later at page 14 of this Bulletin); and hence are about 350 feet above the sea. The Upper Lake is decidedly pretty, despite the shallow-marshy aspect—which it shares with most others of the little lakes of the Eastern Plain. The wooded shores present many attractive upland banks fringed with pretty white birches. One feature, however, is of special interest. On the western side of the lake is a piece of partly cleared upland, containing well-built sporting camps; and in the fringe of pretty woods left between field and shore is a remarkable cold spring, one of the most attractive, perhaps the most attractive, of all the beautiful springs I have seen in New Brunswick. It wells up in a rocky pool against a ledge bank overhung by thrifty young birches, and pours out in a crystalline stream through a channel all bordered by the crispest green cress. This is the reputed “poison spring” of earlier mention in these notes, (No. 79, page 238, and 126, page 440) though I consider its good character now completely established.* Fifty yards to the eastward, on the shore, is another running spring, likewise good, but in all ways inferior to this. The beauty of the spring and the excellence and attractiveness of the immediate neighborhood as a camp ground, must have made this place a favorite resort of the Indian hunters from time immemorial. They had a portage from the North Fork of Canaan to this lake, as will be shown later in these notes, page 31 of this Bulletin.

The Upper Lake empties by a narrow winding deep thoroughfare, of a mile in length, running slowly through meadow swamp and bog into the Lower Lake,—a rather inhospitable sheet of water lying against a ridge on the east. The outlet is a brook, easily navigable at fair water; it runs first in good woods, but soon enters an extensive alder swamp, now deeply flooded by extensive beaver works, and obviously filling a third large lake basin. Through this basin the sluggish

* In the last-mentioned Note, I expressed the view that the cause of the death of great numbers of fish in small shoal lakes in some winters is deficiency of oxygen. I find that this view is confirmed, with exact account of details, in an article by H. Heyking, in *Deutsche Landwirtschaftliche Presse*, XI., Jan. 9, 1912.

stream winds greatly in a channel so narrow and obstructed by alders as to prove a sore trial to the canoeman: but after some two or three miles it opens out in wide pleasant meadows, falls over a series of five new beaver dams, and then comes once more to upland. Then it runs quietly for a long distance northeastward, in another flat wooded country, winding greatly, even around to the southeast and south, as a very dark stillwater stream, mostly with meadowy banks, but sometimes in small rips over gravel and sandstones, with banks and rare low cliffs of the same. Thus it continues constantly growing in size, and receiving several branches, down to a large meadowy brook, the Fork Stream or South Branch, which is said to run up parallel with Salmon River and head near the latter as shown by our map.

At this Fork the stream swings north and northwest, and finally around to the west, growing larger in a country of much higher wooded banks, but always displaying long stillwaters separated by occasional stony rips, making it a most attractive stream for the canoeman; and thus it continues down to Stony Brook,—a fine clear stream with good fishing pools just below its mouth.

Below Stony Brook the stream enlarges a good deal, in a higher country, and exhibits many fine long winding stillwaters in most attractive intervalles, with good reaches in higher wooded country, separated by some shoal stony rips showing occasional ledges. Thus it is to Coy Brook, a large wide shallow swift stream; then follow more stillwaters with more stony rips, at the chief of which the stream turns and empties by a wide mouth into the quiet waters of Salmon River.

As a whole the stream leaves the impression of a singular uniformity of character, its dark water moving slowly through long stillwaters broken by regularly-recurring stony rips, in a low country of meadowy banks occasionally giving place to sandstones in steep banks or rare low cliffs. It is a fine stream for the canoeist, at least in the fair water we had.

We turn now to the probable physiographic origin of Lake Stream. Here, as for so much of the Eastern Plain

region, the relief of the country is so low and our maps so poor (only the lowermost course of the stream has been surveyed) that our conclusions must for the present be principally speculative. But the upper part, from the Lakes to the Fork Stream, seems to line up fairly well with the Coal Branch of Richibucto in one direction, and with the principal part of Coal Creek in the other. Hence I think these waters lie in remnants or persistences of an ancient valley, one of the distinctive Northumbrian series, which headed beyond Grand Lake, and emptied into the sea through Upper Coal Branch and perhaps the Chickpish; and this valley should be added to those of the Northumbrian system. (Note No. 93). The lower course of the stream lines up with Upper Salmon River as mentioned in Note 126, page 437, while the cross part between has of course the same origin as the corresponding part of Salmon River to the eastward. (Note No. 126, page 438.)

130.—ON THE PHYSIOGRAPHIC CHARACTERISTICS OF COAL CREEK, QUEENS COUNTY.

Coal Creek, which empties into the extreme head of Grand Lake in Queens County, is a far more interesting and attractive stream than its imperfect representation upon our maps, or its name, would imply. This fact I discovered during a canoe trip down almost its entire length last July.* Its geography is represented, more fully than heretofore, upon the large map accompanying the next Note. This map is based upon the plans in the Crown Land office, extended by information from various sources.

Coal Creek rises south of the new railroad at a height of over 300 feet above sea level, at a place on the eastern sandstone plain shown approximately on the map. It first runs to the northward, then swings around to the west, and then south, where it crosses the railroad in the bottom of

*I was accompanied on this trip, as mentioned in the Note on Lake Stream, by my friend Mr. Leonard Smith, of Grangeville, Kent County.

a very wide open valley, obviously far larger than the present stream could have formed. The great size of this valley is attested by the immense "fill" here required for the railroad, said to be the largest in all New Brunswick. At the crossing it is a pleasant clear-brown little stream running in rips and pools over a gravelly and stony bottom, and large enough to permit canoeing at moderately-high water. Downward it keeps the same character, but rapidly enlarges, having always upland banks often high with glacial terraces, and developing very pleasant trout pools between rips with considerable drop. Thus it continues, a very pleasant canoe stream in fair water, and always pretty, down some four or five miles to the Salt Springs.

These springs, a rather remarkable place and one of the chief claims of Coal Creek to notice, deserve some description, in extension of the brief account, given from report, already published in Note No. 79 of this series. The place is too prominent to be missed or mistaken. Coming down stream towards it, one rounds an abrupt turn, and sees ahead on the left a little brook, just below which is a low open terrace bank falling to a muddy beach. Coming nearer, one sees that the place is all trodden as bare as a barnyard by the innumerable animals, principally moose and deer, which resort there to lick the salt earth. Ascending the few feet to the terrace, one finds that it likewise is trodden quite bare except for an occasional small island of grass close against some old stump, while deeply trodden paths lead radiating away to the woods. Evidently the salt soaks from the springs through the soil of a considerable area, perhaps a quarter acre. As to the springs proper, there is apparently one on the top of the terrace near the bank, for a damp depression exists there, trodden more completely, if possible, than elsewhere. But the visible spring runs out on the beach, and being but a foot above low water mark is completely submerged at high water. It is only a small affair, a foot across and shallow, but from its quicksandy bottom the water is constantly boiling up, at some times more actively than others, in a kind of rhythm,

while at intervals copious large bubbles of gas are emitted. I am told by Mr. P. H. Welch that this gas extinguishes a match, a statement which, unfortunately, I forgot to test; but the circumstances would imply that the gas is carbon dioxide. The water has a distinctly, but not specially, salt taste. As to the nature of the contiguous vegetation, a question that will arise in the minds of most botanists, though I made the most careful search that I could, (with an ardour somewhat dampened, I confess, by the continuous downpour of rain that prevailed during our visit), I could find no trace of halophilous or salt-marsh plants, such as occur so copiously at the Sussex salt springs, as described in Note No. 7.

In the vicinity of the salt springs the stream runs more quietly in a rather open country, through gravel-bottomed stillwaters and pools, winding so greatly as to have acquired for this part of the river the name of *Round Turns*. A good mile below the springs, however, after receiving large branches on both sides, its character gradually changes, and it proceeds to broaden and run in shoal rips over a schistose instead of a sandstone bed. Three or four miles further down, where it receives a fine branch from the east and still runs in continuous shallow rips, the stream is entering a region of high stony bluff or cliff banks, composed of schistose slates, and soon is zigzagging in abrupt turns among cliffs whose crystalline aspect and varied vegetation is a great surprise in this sandstone country, and suggestive rather of northern rivers, like the Serpentine. Of course this is the area of Devonian rocks indicated upon the Geological map and mentioned in the Reports. This character culminates some two miles below the McIntyre Brook, after which the valley walls, while preserving for a time their general aspect, gradually open and fall off, though the river bed continues broad and shoal, making the canoeing markedly difficult. Gradually the country opens out still more, and the stream becomes quieter and deeper while some intervals appear, and the uppermost settlement, and then the upper bridge, is reached. A mile below this bridge appear the waterlogged stumps and

other refuse which indicate the merging of the current with the quiet deadwaters of the lake. Thence downward it is a typical deadwater creek, winding through intervalles and open marshes, and displaying many old coal workings on its occasional upland banks; and thus it continues down to the narrows where two bridges cross, marking the boundary between Coal Creek and Grand Lake.

Obviously the name "Creek" was applied originally to the lower three miles of its course, where the word is perfectly appropriate. Extended to the whole stream, however, it is a marked misnomer, quite unsuitable to its swift current, deep valley and stony cliffs. The name Coal Stream would have been much better.

As to the probable physiographic origin of Coal Creek, that seems sufficiently clear. The parallelism of the valley with the Salmon and Gaspereau Rivers, the great size of the valley in comparison with the present stream, and the strongly re-entrant direction of its principal branches, all units to indicate that it is an important member of the series of parallel Northumbrian rivers described in the earlier Note No. 93. Further, the exactness with which it lines up with the Northeast Arm of Grand Lake shows clearly enough that the source of this valley lay on the northeast of the Lake, via Flowers Cove. As to its outlet in the other direction, it seems most likely that this lay through the upper part of Lake Stream and the Coal Branch of Richibucto, and perhaps the Chockpish, as mentioned in the preceding Note. These streams together, therefore, would occupy areas of the Northumbrian valleys.

A very interesting point in the physiographic relations of Coal Creek to the Washademoak waters concerns the elevated ridges between them. Thus Pangburn Ridge, shown on the map accompanying the next Note, can be traced, so I am told, for a long distance northeast and southwest in a low extension. It must have some definite relations with the Devonian area on Coal Creek, and with the "Cumberland Mountains," southeast of Cumberland Creek,—a matter, to be investigated.

131.—ON THE PHYSIOGRAPHIC CHARACTERISTICS OF THE
WASHADEMOAK-CANAAN RIVER.

Read in Abstract June 10, 1913.

The Washademoak, or Canaan River, is one of the principal branches of the lower Saint John, into which it flows from a source far to the eastward. Its position, on the Central Plain but close to the Southern Highlands, together with some peculiar cartographical features, have long allured me to its physiographic study. In August, 1912, I was able to traverse practically its entire length by canoe for this purpose, while a year later I descended in the same way the principal branch, the North Fork, from near its source, incidentally observing again the main river from the Fork down to the railroad below Coles Island.* The results of my observations, along with such other information as I have been able to obtain concerning the river, are contained in the following Note and on the accompanying map. I do not here include Washademoak Lake, because I expect to present a later note thereon to the Society.

First, however, we take note of the development of our knowledge of the river. It achieved a considerable prominence in the French period of our history through its use as a part of the Indian and French route of travel from the Chignecto region to Quebec, a matter on which further comment will be found in the Supplement to this Note; but

*My trip along the main river from near Canaan Station to the Saint John was made in company with my brother Mr. W. K. Ganong. It was part of a canoe journey from Baie Verte to Fredericton via the sea coast, the Buctouche River (to head of tide), the Washademoak and the Saint John,—a route and method little used in our day though having, I believe, abundant precedents in former times. On my trip down the North Fork I was accompanied by Mr. Leonard Smith, as mentioned in the earlier Note on Lake Stream.

Incorporated in this paper, and on the map, is a great deal of information for which I am indebted to a number of very obliging persons. Concerning the headwaters of the river in relation to the Buctouche, and the old Indian portage that lay between them, I have had abundant and willing co-operation from Mr. Eugene Bernard of Canaan Station, who has known that region long and intimately; and I have also had information concerning the same region from Mr. Percy Gallagher, the principal guide to those waters. Many facts about lower branches of the Canaan have been furnished by Mr. S. E. McDonald of Butternut Ridge, while facts in large number about the lower Canaan and the North Fork, have been given me by Mr. J. T. Hetherington of Jenkins, Queens County, and by Mr. P. H. Welch, of Fulton Brook, Queens County. To all of these courteous gentlemen I wish here to express my best thanks.

it is nevertheless badly represented on all of the French maps, where it is confused more or less with Salmon River, for a reason which also will be noted in the Supplement. The earlier English maps have it not much better, and it is not until Bonnor's Map of New Brunswick of 1820 that it is even tolerably laid down, while Wilkinson gave it, on his fine Map of New Brunswick of 1859, a representation well nigh as complete as that on our present maps and much better in detail. It has never been surveyed as a whole, and our maps are all piecéd out from various surveys made in connection with settlements or timber berths. The lower part of the river was settled by expansion of Loyalist settlers and their descendants from the Lake, while its middle part between the North Fork and Nevers Brook, was before 1800 taken up by descendants of Loyalists, who, attracted by the rich intervalles there, established the New Canaan settlement from which the river took its name, now abbreviated to Canaan. These settlements are described in the *Transactions of the Royal Society of Canada*, X, 1904, ii, 57, 118, 142, 154. Above Nevers Brook the river is wilderness to the crossing of the Intercolonial,—one of the many parts of New Brunswick still reserved to the lumberman and sportsman.

The river does not figure largely in published records. Its lower part (apparently not above Riders Brook) was visited and described, correctly as to its geology, by Gesner, as recorded in his *Third Report*, 1841, 59. Later it was examined up to the Canaan Settlements (though apparently not above) by Professor Bailey and Mr. Matthew and Mr. Ells as recorded on their *Report* for 1872-3 and with results embodied on the geological map. Isolated reference also occur in *Reports* by Dr. Chalmers, notably that for 1890, N, as may be traced through the Indexes to the Geological Reports, while some information is contained on his surface geology map. Brief but interesting references to the headwaters of the river occur in an Emigration report by Lieut.-Col. Cockburn for 1827 (*British Blue Book*, of 1828, pages 45, 46), while Sir James Alexander

in his book *L'Acadie*, ii, 1849, 128-150, has some very interesting and historically valuable notes made in connection with a survey across its upper course, and Dashwood's *Chiploquorgan*, 1871, 97, 131, has mention of hunting trips for caribou on the bogs near its head. But further than these, and a few notes in the Supplement, I can find nothing worthy of mention.

The place nomenclature of the river presents nothing of special interest, all of the names, as the map will show, being of the simple obvious descriptive sort. Only the name Washademoak is Indian though its meaning is still uncertain; and that, although its original name, is now practically displaced by Canaan for the river, the progress of the change being easily followed through the maps. The name persists, however, for the Lake through which the river enters the Saint John.

The river rises in the eastern part of New Brunswick on that minor watershed of the central plain which is followed approximately by the Intercolonial Railway. The country here, like practically all of that in which the river flows, is underlaid by the soft gray sandstones of the Carboniferous age. The actual source of the river, which I have not seen, lies in the Big Canaan Bog crossed by the railroad at a height of about 240 feet above the sea, the same bog giving origin to the main Buctouche. Thence it flows northerly through flat upland and meadows as a small brown sluggish stream, crossing the highway as a brown running brook, and enters a great natural meadow. Here it makes an abrupt reverse turn and then swings to the westward, after which, as a narrow stillwater stream, it winds greatly for two or three miles through the largest and finest natural meadow known to me in New Brunswick, one fully visible from the railroad which crosses it on a high fill. These meadows, of course, were originally beaver ponds, in which all of the trees were killed by the standing water and replaced by grass when the dams were abandoned. Here comes in the Fork Stream, just below which, it is said, the old Indian portage started to the Buctouche. Then the enlarged stream keeps the same

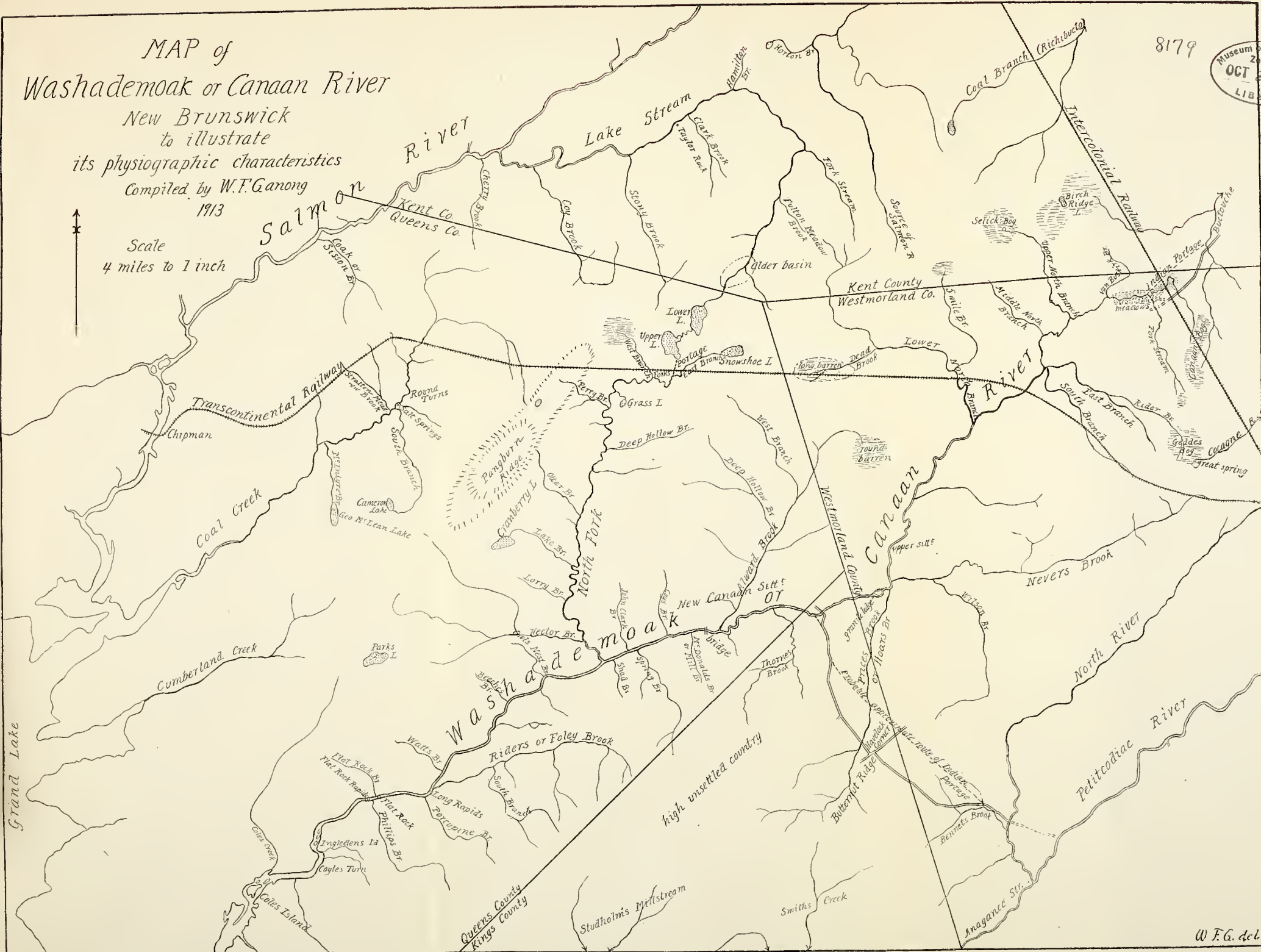

MAP of
Washademoak or Canaan River

*New Brunswick
to illustrate
its physiographic characteristics*

Compiled by W.F. Ganong
1913

Scale
4 miles to 1 inch

8179



W. F. G. del

MAP OF
WEST-HART MOUNTAIN & COASTAL RIVER



stillwater character in meadows for two or three miles, when it gradually enters a region of low gravel banks and terraces and begins to drop over small gravelly rips which gradually give place to sandstone, forming, evidently, the western rim of the basin in which the great meadows lie. Then the country becomes higher, and the river runs in a series of long stillwaters separated by short smooth rips, flowing between terrace banks, burnt of old time and still partially and pleasantly open. Thus it continues past the Upper North Branch, a swift stream, and the Middle North Branch, a meadowy stream, some cut banks of sand plains showing between the two. Below, the river becomes somewhat swifter with more drop and more frequent rips, which finally develop into mild rapids over a rough sandstone bottom,—all in a still higher country presenting some low cliffs to the river. Then it enters an open pleasant basin in which it receives the united East and South Branches, which make their junction only a little way from the main stream. All the river down to this point we found a most easy and pleasing canoe stream. We had, however, good water to aid, and it is said to be well-nigh unnavigable at times.

Below this fork of the river, the stream becomes somewhat swifter, with occasional sandstone rips in a higher country, which at the new railroad bridge shows cliffs on the east bank. The great height of this bridge (eighty feet above the stream, which is here about 150 feet above the sea), shows that the general elevation of the country is higher above the river than one would suspect. The bridge itself permits one to see that this valley is a very wide, and hence presumably ancient, trough, into the bottom of which the modern river has cut a deeper channel. This "rejuvenated" type is indeed by far the commonest type of valley in the province. Then the river keeps the same general character, a charming stream which might, however, give the canoeman trouble at low water, down to the Lower North Branch, a large meadowy stream, where the country opens out to form an immense intervale-filled basin.

Below the Lower North Branch the river keeps the same general character though rapidly enlarging. It flows in a series of fine long stillwaters or quickwaters broken by occasional rips, between banks occasionally of meadow, though oftener of sand gravel or sandstone rising at times to low cliffs, while wooded upland and open terrace succeed in a fine alternation that baffles attempts at description. All of this part of the river we found most attractive, though the troubles that low water may bring to the canoeman might give a different impression. Then gradually the country opens out, more intervale appears, the uppermost settlement is met, and the river enters a fine great open intervale-filled basin in which it receives Nevers and Prices Brooks; and here the upper section of the river may be considered to end.

The large branches of this part of the river are known to me only at their mouths, and their representation on the map is the best I have been able to give from various sources of information. All of them take their rise on low minor watersheds of the Eastern Plain, which exhibit, apparently, all the distinctive aspects of that plain,—low swells of wooded upland separated by wide swamps, meadows and bogs, in which the streams wind sluggishly. I could not learn that any of the streams exhibit notable features, though a gulch is reported from Riders Brook, and springs of unusual size or mineral quality are said to occur at several places. Of course a great deal of lumbering has been done on all of these branches.

The intervale-filled basin in which Nevers and Prices Brooks meet the main river is of great extent, too great indeed, as it seems, to have been formed as a result of simple erosion. Below, the river continues to wind in wide intervalles of the typical elm-studded sort, all farmed and attractive, down to the bridge at the Petitcodiac Road. In this distance occurs one feature of very special interest, namely, just below the large island marked on the map the river becomes constricted by the presence of a rocky ledge which pushes out from the left or south bank. This ledge

is granite, of a typical coarse-grained sort, and large boulders thereof are scattered a long way down stream. This important outcrop, which has escaped mention in the Geological Reports or on the Geological map, is most unexpected in this typical carboniferous region. It is, however, obviously an extension of a granite outcrop described in the Geological Reports (1875-6, page 366) as occurring on Thornes Brook in conjunction with the "Pre-Cambrian" rocks there, although it is not shown on the Geological map.

Below the Petitcodiac bridge, near which, as will be noted in the Supplement, started the old Indian portage to the Petitcodiac, the river continues to wind greatly (far more sinuously than shown on our map), through extensive intervalles of the typical valuable sort, the intervalles which proved the attraction to the early New Canaan settlers. Gradually downwards, however, they grow narrower as the valley walls approach, until, at the bridge below Alward Brook, the true intervalles give place to a remarkable fine-sand plain of considerable extent, partly farmed and partly wooded, through which the river flows in long curves in a valley of almost canal-like evenness of width, depth, sluggishness of current, and uniformity of bank slope, the like of which I have not seen in equal degree on any other New Brunswick river. As one travels along in a canoe, he is constantly impressed by the uniformity in all of these features, and especially by the regularity of the convex uproll of the grassy and bushy banks to the terrace of equal uniformity of height, some fifteen feet above the river. The material of the banks is a very fine sand, much coarser than the ordinary mud of the intervalles, suggesting a flow in glacial times from this coarser to the finer materials above. This character continues practically down to the North Fork, though with some small sandstone exposures near the end, and even to some extent below.

The North Fork, sometimes called Taylors Millstream, is a stream of an interest unexpected in this part of the country, as I found in my trip down from the new railroad

to its mouth. It rises in Snowshoe Lake, said to be a typical small marsh-bordered lake in a flat country, at a height—judging from the railway levels, of about 340 feet above the sea,—an elevation a hundred feet greater than that of the source of the main river. At the crossing of the railroad it is a small brown stream which winds sluggishly towards the westward through alders, and then takes a more open and rapid, and finally very winding course to the Forks, which it reaches in the midst of extensive open natural meadows. Here it receives the West Branch, a smaller stream, which, however, occupies a wide valley crossed by a great fill of the new railway, and heads, I am told, in an extensive bog as shown by our map. The stream then flows westward for some two miles, passing from the meadows into a country of rounded, burnt, barren, glacial hills, through which it runs smoothly in long uniform still-waters broken by short abrupt rips, this part forming a charming canoe stream. Then it swings to the southward and enters a higher and now wooded country, still of glacial material, for no ledge rock shows; it now becomes wider and shoaler and acquire much drop, until presently it is falling in continuous rapid down a very stony and bouldery bed of glacial materials, making a stream of much attractiveness though considerable difficulty for the canoeman. Thus it continues for some five or six miles, receiving several branches, of which some are very pretty; then it crosses some sandstone ledges of a reddish color and gradually enters an open attractive intervale basin in which it receives a large brook from the westward. In this basin it winds for some two miles, and then it enters again a higher country in which, enlarged in size, it continues for two or three miles, still wide, rapid and shallow, but with less drop than above. In this part, on the right bank, comes in a falling cold spring brook with a charming camp ground on a high grassy brow just below. All this part, like the stream as a whole, is surprisingly large, attractive, and rapid, having thus more the aspect of some of the northern rivers than of those distinctive of the Central Plain—in this respect recalling

Coal Creek. It makes the impression of occupying a rather deep valley in a high country all choked with glacial drift. Then it enters another large intervale basin, well settled and cultivated, in which it winds sinuously back and forth, receiving Cranberry Brook from the westward. This intervale extends for three or four miles, below which the valley again closes in, the reddish sandstones reappear, and the stream flows for a time in gentle rips through a stony valley. Soon there appear, in low cliffs, the striking laminated slates or argillites, which are shown on the Geological map and mentioned in the Reports as Devonian. Below comes in Hector Brook, a fine large stream, through a deep narrow valley, below which the country opens out and the stream develops a border of attractive cultivated intervale down to near the main river, when it passes some low sandstone cliffs and pours through intervale into the main river.

Below the North Fork the character of the main river gradually changes. It continues to show the same long still-water character, with only occasional and mild rips, but the valley is obviously narrower and the country higher than above, while the banks become prevailingly stony and rise often to cliffs. A mile or two below the Fork, on the right or north bank, occurs one of the finest examples of unconformability that it has ever been my fortune to see, for here the level gray sandstones may be seen to rest upon the edges of the highly tilted slates which are described in the Geological Reports as Pre-carboniferous argillites, and marked on the Geological map as Devonian. Somewhat lower down, on the opposite, or south bank, the same laminated gray argillies form a steep, high, almost cliff-like bank of a very singular appearance, for, seen from upstream, the faces of the laminae are visible in great shining sheets, while seen from downstream only their black edges are visible.* Lower still some fine

*Some very striking legend must have been told by the Indians to explain this remarkable place, though the Indian who knows this river the best, Chief James Paul of Saint Marys, was unable to recall any such, when I interviewed him on the subject. He told me, however, that a curious ledge near the mouth of the North Fork Stream gave origin to the Indian name of that stream, vs. Sagunik, which word, he said, means a gill of a fish, the rock having that appearance. He refers here, of course, to one of the exposures of these laminated argillites.

sandstone cliffs appear, mostly on the left bank; then the country falls off a little as the river swings around to receive the valley of Riders Brook.

Riders Brook comes in through meadow, and just below its mouth occurs a long and considerable rapid, the heaviest on the river, the Long Rapids, which exhibit a good pitch of water broken by boulders and ledges, and needing skill to navigate safely. Except for this and one or two others of much less fall below, including Flat Rock Rapids, where smooth ledge sandstone extends across the channel, the river preserves its long stillwater character. Gradually the country opens out and develops again low terrace and intervalle banks, becoming almost lake-like in character at Ingledens Islands, which have something of an estuarine aspect. Then, swinging around a great turn to avoid a square-across ridge, and passing again some low cliffs, the valley opens out once more, and the elevated upland Coles Island is reached, where the river may be taken to end and Washademoak Lake to begin.

A striking feature of the Washademoak River is the smallness of its drop from the great basin at Nevers Brook, and especially from the head of the "canal" near Alward Brook, down to tidewater at Coles Island, the drop, indeed, being smaller than that of any equal length of river known to me in New Brunswick outside of the estuarine lower Saint John. The effects of tide are felt much above Coles Island, where I have seen the tidal current setting upstream with considerable rapidity; and my kind and interested correspondent, Mr. I. T. Hetherington, informs me that he has made a special study of this question for the Dominion Government, and has located the uppermost influence of the tide at Flat Rock, marked upon our map. Needless to say, no trace of salt, or even brackish, water is felt at this distance from the sea, the tide effect being merely the backing up of the fresh water. Another feature of interest is connected with the cliffs, which, all the way to the head of the river, are prevailingly more abundant and conspicuous on the southeast bank,—precisely as in case of Salmon River and Gaspereau,

and doubtless for similar reasons, (Note No. 125, page 428, No. 126, page 441).

Reviewing the river geologically, it is found to flow almost wholly through the gray carboniferous sandstone of the eastern plain, the only exceptions being the granite below the Nevers Brook basin, and the Devonian argillites on and below the North Fork. These rocks, however, are obviously extensions, as lower offlying parallel ridges, of the masses of such rocks lying just to the southward in the Southern Highlands. This river, indeed, lies in the angle, so to speak, between the Central Plain and the Southern Highlands.

We consider now the physiographic origin of this interesting river, which exhibits some very puzzling features. Thus its lower course, from below Coles Island up to near the North Fork, has a direction parallel with that of Coal Creek, Salmon River, Gaspereau, Cains River, and others of the remarkable parallel Northumbrian series (described in Note No. 93); and like them it lines up perfectly with one of the rivers which empties into Northumberland Strait, in this case, the Buctouche, presumably its ancient outlet. On the other hand, the part of the river above the North Fork, has a different direction, and one, moreover, which continues perfectly the course of Nevers Brook, showing that these two occupy a single valley morphologically; but the question as to the origin of this part is rendered all the more puzzling by the curious arrangement of Prices Brook in relation to the Canaan above Nevers Brook, for these two streams likewise seem clearly to form one valley, which, however, crosses the one just mentioned nearly at right angles. I am inclined to think that the solution will be found on further study to be this, that the Lower Canaan, below the North Fork, did formerly have a course across country to the Buctouche, and I predict that further exploration and better mapping of that country will reveal relics of such an old drainage. The part above the North Fork, including Nevers Brook, must represent an independent valley, which must also have emptied eastward originally. As to its origin I can only suggest that

it was then a branch of a much greater valley which now persists in part in that fine great trough containing the Belleisle and the sources of the Millstream, and which formerly emptied I believe, along the general course of the present Cocagne and across the present Egmont Bay through Prince Edward Island,—a matter which I hope later to discuss in detail.* In this case Prices Brook was then a branch which has since worked back to the other valley. Then in times long past, when these old Northumbrian Rivers, formerly all flowing northeastward, had their valleys broken across and their upper courses turned westward by the elevation of the Eastern Watershed (that now followed approximately by the Intercolonial Railway), this Nevers-Canaan valley found its lowest outlet into the Washademoak system, back into which it had presumably almost cut. The great branches, North Fork, Alward Brook, and the Canaan above Nevers Brook would then be later streams, formed after the reversal of the Washademoak, and not relics of the most ancient drainage from the Southern Highlands into the Eastern Plain as I once thought; and on this basis the alignment of Prices Brook with the Upper Canaan would be coincidental and not causal. This leaves unexplained the curious course of Riders Brook, which has a direction suggestive of an origin as the head of the Washademoak below it, although the somewhat re-entrant direction of its branches suggested a former course for them directly across into the northeasterly flowing Washademoak. The origin of Riders Brook, however, seems reasonably clear, for being caught between the Southern Highlands and that offlying parallel ridge of the same, which is represented by the Devonian rocks through which the Washademoak cuts between Riders Brook and the North Fork, Riders Brook represents a valley formed by the erosion out of the softer rocks between two harder ridges, exactly the type of valley which has given us the great valleys just to the southward,—the Belleisle-Millstream, the North River-Smiths Creek-Kennebecasis, and

*This great Belleisle-Millstream valley attracted the attention of Gesner, who mentions it several times in his *Third Report*, 32, 42, and in his *New Brunswick*, 146.

others. This offlying ridge of harder rocks of the Southern Highlands (the one cut by the Washademoak and the lower North Fork) is not the only one of that series, however, for others appear on Coal Creek, probably in the prominent Cumberland Mountains, and in other high land in that vicinity. Taken collectively these offlying parallel ridges form a marked extension or bulge of the Southern Highlands, centering in a line running northwest from the sources of Riders Brook across the head of Grand Lake. This bulge of the Southern Highlands I take it, formed once a minor watershed, and on this the Nevers-Canaan valley headed. Had this bulge of the Southern Highlands not existed, the Washademoak, no doubt, would have had as straight and homogeneous a course across country as Salmon River, and its irregularities are chiefly due to the presence of that bulge. The Washademoak, therefore, is primarily one of the Northumbrian Rivers, complicated in its details by the presence and extension of the Southern Highlands.

SUPPLEMENT TO NOTE 131.—THE ANCIENT INDIAN PORTAGES
FROM THE WASHADEMOAK TO ADJACENT WATERS.

These were three in number.

(a).—*The Indian Portage from the Washademoak to the Buctouche.* This, although obviously a minor route of aboriginal travel, had yet some importance, as shown by the references given in the *Transactions of The Royal Society of Canada*, V, 1899, ii, 248 and XII, 1906, ii, 92, to which should be added an interesting item in the *10th Report of the U. S. Bureau of Ethnology*, 334. Like others of the portages in the settled parts of the Province, it has long been abandoned; and its exact location will soon be lost beyond discovery unless recovered at once and fixed, as it should be, for future historical use. Its general location is shown on a map in the Crown Land Office made by the Surveyor Layton in 1831, and reproduced in the *Transactions*, XII, above mentioned; but unfortunately it is only a sketch, not from survey, and is not helpful as to the exact location of the portage path on the ground. On my first visit to this vicinity in 1912 I could not investigate the question, but I made a special visit to

Canaan Station for the purpose in August 1913. The geographical relations of the two rivers (see the large map given earlier in this Note) suggest that the portage probably left the Canaan at the big bend in the meadow east of the railway track, and this supposition seemed fully sustained by local information which I was given. Here, in full view from the railway, the winding stillwater stream comes to within a hundred yards, across open firm meadow, from low open rocky upland, which offers a most suitable opportunity for landing and camping. I accordingly mapped the surroundings upon a large scale with much care.* Later, however, I had the good fortune to meet Mr. Eugene Bernard, a life-long resident of Canaan Station, a man much interested in all local matters; and he assured me that he remembers the portage when the path was still plain all the way across, running in green woods long since burnt away; and that it actually left the Canaan somewhat less than half a mile west of the railway, at a place about one hundred yards westward of the Forks where Fork Stream enters, the place shown approximately on the large map accompanying this Note. Mr. Bernard also writes me that he has interviewed another of the earliest settlers at Canaan Station, who tells him independently the same thing,—that the portage path started just west of the Forks west of the Railway. Such a supposition agrees as well with Layton's map above mentioned as does my earlier view, in fact somewhat better; and I am ready to agree that such other data as we possess is in agreement with Mr. Bernard's information. In reply to my query why the Indians would leave the stream at this point and then travel for half a mile or more parallel with and near it, Mr. Bernard suggests that in those days the very small narrow and crooked stream above the Fork would be so densely choked with alders as to be practically impassable. This seems to be reasonable, even though I know through what dense alders, and up what tiny streams, the Indians sometimes travelled on their portage route; (e. g.: the Wagan and Wagensis on the Grand River-Restigouche route); and even if this route were not actually impassable, it might be much less labor to carry along the upland than to navigate the small winding encumbered stream. Unfortunately I did not receive this information in time to allow me to study this starting place for myself, but this I hope later to do, and to

*The little stream shown on the Geological map as extending northeastward from this angle, does not exist.

report upon it, along with the remainder of the route, in a future Note describing the physiographic characteristics of the Buctouche River.

Mr. Bernard tells me that the portage path ran eastward as shown on my map, and reached the Buctouche at a bank, some fifteen feet high, about four hundred yards below the present highway bridge, where the river swings sharply to the eastward. The place is now overgrown, though some modern camps are visible a little higher up stream.

A point of interest, well-known locally, is the fact that about half way over, the path ran across the present farm of Mr. Albert Peters, and here, some fifty yards from the path, there was formerly an Indian grave with carved poplars at head and foot. Some years ago it was opened, in the belief that it might contain something of value; but nothing except bones was found. Not far away are some springs, at which it is supposed there was some kind of camp ground.

I found at Canaan Station that the portage is already confused in the minds of some residents with a certain "old road"; but this was a temporary affair along which stone was hauled from the Buctouche to the Canaan, in the general direction of the portage, for use in building the Railway; and the future student of the subject must not allow himself to think he has discovered something of importance which I had missed!

While the Maliseet Indians of the River Saint John doubtless made use of this route at times, as indeed one of the references above cited shows, it is likely that it was chiefly a route of the North Shore Micmacs on their hunting trips into the interior. This, indeed, is confirmed by a statement of Mr. S. E. McDonald made to Mr. I. T. Hetherington, that in his father's time the Micmacs of Prince Edward Island used to come regularly by this route to hunt on the Upper Canaan in autumn and winter, and that they had an important camp ground on the Millstream, the McDonalds Brook of our map.

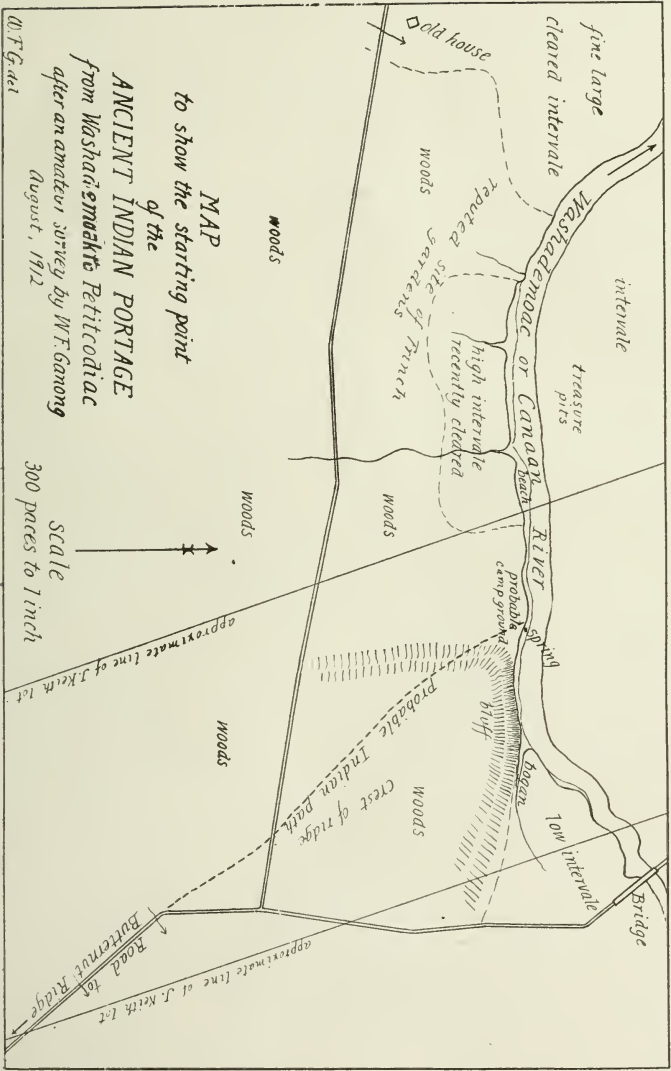
(b). — *The Indian portage from the Washademoak to the Petitcodiac.*

This, though one of the longest, was one of the most important of all the early portage paths in New Brunswick, for it lay on the route of the old French and Indian line of travel between the Chignecto region and Quebec. For this reason it finds mention in records and on maps in the French period as recorded in the *Transactions of the Royal Society*

of Canada, V, 1899, ii, 246 and XII, 1906, ii, 90, where also the known later references are given.

The general situation of this portage is indicated by its representation on the early English maps of the Province (those of Bonnor of 1820, Baillie and Kendall of 1831 and that of Baillie of 1832), in conjunction with the geographical relations of the two rivers concerned. It left the Petitcodiac near its westerly bend and reached the Canaan somewhere on the southerly bend west of Prices Brook. But a general location for these ancient and once-important routes of travel does not satisfy the interested student of local events, who desires to place his foot upon the very ground where the old paths ran, and look upon the identical banks and waters which experienced the company of the old voyageurs. For such exact location of this particular portage no extant map or description suffices, and we turn perforce to other evidence. First, of course, is tradition, which, for events as recent as the use of these portages, has value, especially if used chiefly as a guide in the search for other evidence. As to tradition, I was told some years ago by Dr. B. S. Thorne of Butternut Ridge, one of the best informed of the older residents of that region, (see the *Transactions* XII, above cited), that the route of the portage, according to the early settlers, is followed approximately by the present highway road from Petitcodiac through Havelock Corner to Canaan, excepting that (compare the accompanying with the large map), a half mile from the Canaan end (not a mile as stated in the *Transactions* above mentioned), the present road swings out of the course of the old path, which kept on and reached the river a quarter of a mile below the present bridge. In further confirmation of the correctness of this location Dr. Thorne told me (I am quoting his letters, later confirmed by an interview with him), that on the fine great intervalles just below the portage the French had gardens planted with plum, gooseberry and currant bushes.* The neighboring intervalles, he added, have been much dug over by treasure seekers, and a resident of the Canaan Settlement showed me the place — on the North Side of the river opposite and a little below where the portage path is marked on the accompanying map. Dr. Thorne also told me that many Indian relics have been found along the river in this vicinity. These evidences of Indian and French occupancy, of course, have their value in this connection

*It is possible that this French settlement is the "Village of Acadians" marked some maps of about 1755, at the western end of the portage.



since the ends of portages were very usual camp or village sites. Now this tradition as to the relation of Indian path to modern road is supported, so far as the Canaan end of the portage is concerned, by two other items of good evidence. First, though our maps of this part of the Canaan are still very imperfect, it seems clear that this place, if not the nearest turn of the Canaan to the Petitcodiac, is at least practically as near to it as any other part of the river, while considerably farther to the westward, the direction of most travel. The plans in the Crown Land Office show that the Geological Survey map is incorrect in placing the Prices-Nevers Brook basin markedly nearer to the Petitcodiac than is this turn; the topography is given correctly upon Wilkinson's Map and upon that given earlier in this Note. Second, there exists in the Crown Land Office at Fredericton an early plan, of 1809, reproduced in the *Transactions* XII, above cited, which shows a "Blas'd Path leading to River Petitcodiac, this path actual survey." Now this path starts on that map from the Canaan near the middle of a lot registered to John Keith, which lot is known to cover exactly the place where Dr. Thorne affirms the Indian portage started. It is true the map does not say that this "blas'd path" is the Indian portage, but it is wholly improbable that, with a well marked and long used Indian portage path somewhere near by, a brand new path would have been blazed through this broad tract of wilderness.

Taking all of the evidence together, therefore, it seems to harmonize completely in pointing to the situation given by Dr. Thorne as the end of the portage. Accordingly during our descent of the river in 1912 I made a study of the place, with a survey thereof and of the surroundings; and this map is presented herewith. Since the path started in the John Keith lot it was necessary first to locate the lines of that lot, and this, as shown on the map, I was able to do with the aid of residents at the settlement on the north side of the river. After the river passes under the bridge shown at the right of the map, it runs past a piece of irregular low cleared intervale, separated by a muddy bogan and swampy swale from a wooded bluff. Beyond the bluff comes a high intervale or low terrace, now wooded with young growth but evidently once cleared; and this terrace merges gradually to the westward into a fine high intervale recently cleared in part, while beyond it passes into one of the beautiful open well farmed intervalles characteristic of this region, as mention-

ed in the earlier part of this Note. Now the position from which the path must have started seems fixed by the topographical conditions, for it could not have gone over the bluff, which is much too steep for ascent, nor would it have run over the low intervale, since that is barred in large part by the swampy swale and muddy shoal bogan; but every probability favors a starting point on the low terrace just to the westward of the bluff. This affords the nearest convenient access to the water to one coming from the direction of the present highway road, and it is indeed the place to which the continuation of that road points. The dry level low terrace forms a perfectly ideal camping ground, and from it a path would ascend by a very easy grade over the shoulder of the low ridge of which the bluff is the cut end. The beach at this place is a moderate stony slope, making an excellent canoe landing, much the best for some distance up or down stream; while, furthermore, (and this is a point of importance in view of well known Indian prejudices) just on the middle beach at this place there gushes out from under a conglomerate boulder a beautiful little cold spring—one with an aspect of perennial supply. A better combination of features for the landing place of a portage can hardly be imagined, and no other site for a long way up or down the river offers anything like these advantages. Here, accordingly, I believe the old portage path started, taking the course back to and along the highway road as shown by our map.

It may seem some objection that the map of 1809 above mentioned makes the path start a little to the east of the middle of the John Keith lot, instead of a little to the west as I make it. But the appearance of the plan shows clearly that precise accuracy in detail was not intended, so that a general position near the middle of the lot was sufficient for the surveyor's purposes. It is in fact simply impossible that any path could have started exactly where the surveyor shows it on the plan, for that would have led it over the bluffs or through the muddy bogan. It could not have started on the low intervale since that is too far to the eastward, and is out of line with its general course; while moreover the intervale is overflowed at high water. Furthermore the terrace at the spring is exactly the quarter mile below the bridge which the statement of the old residents assigns for the ending of the path.

We consider now the probable course of the portage path across country. Dr. Thorne told me that it is believed to follow approximately the course of the present road. Now

there is no question whatever that the present highway road follows very closely if not exactly the "blas'd path" of the map of 1809; but there are three facts which tend to show that the portage path after following the present course of the highway for some distance, deviated to the eastward, approximately as shown upon our larger map. First, as our large map shows, the present road makes a bow which lengthens markedly the direct distance between the Canaan and Petitcodiac, and every foot of distance counted heavily on the laborious portages. Second, the present road both north and south of Butternut Ridge runs over some great hills, which, as I understand the topography of this region from observations made in driving across this country in August, 1913, are at least partially avoided by a more easterly course. Third, and most important, it probably ran through an old French site, which, as Dr. Thorne first told me, occurs about a mile and a half east of Havelock Corner on the farm of Mr. Howard D. Hicks. Mr. Hicks himself has been so kind as to write me as follows concerning this site. "I would say that Dr. Thorne has informed you correctly. In answer to your first question as to the objects found, my father in cultivating the first time the field to which you have referred, found a case knife and some sickles and some other relics of which I have no recollection, that we supposed were relics of the French or Indians. This field on our farm is often spoken of as the French Field, and at the time my father came here seemed to be a perfect garden with an abundant supply of gooseberry bushes. Just a short distance from this clearing was a log cabin, all this indicating a camping ground of some sort belonging either to the French or Indians. It was on an old road or trail leading from Petitcodiac and I think on to Canaan. It was a very rough road through the woods, winding around trees and over swamps and knolls all the way." Now there seems to be no reason why such an early clearing should have been made, in this wilderness, a mile and a half away from the old route of travel, but on the other hand very good reason why it should have been made as a half way station on the main trail which was long, some twelve to fourteen miles. Mr. Hicks' mention of the road to Petitcodiac, with his emphasis on its winding character, points directly to its identity as the Indian portage. Accordingly I believe the portage path passed through Mr. Hicks' place, thus taking the more direct route indicated by our map. As to why the road to Butternut Ridge, after following the Indian path for some distance,

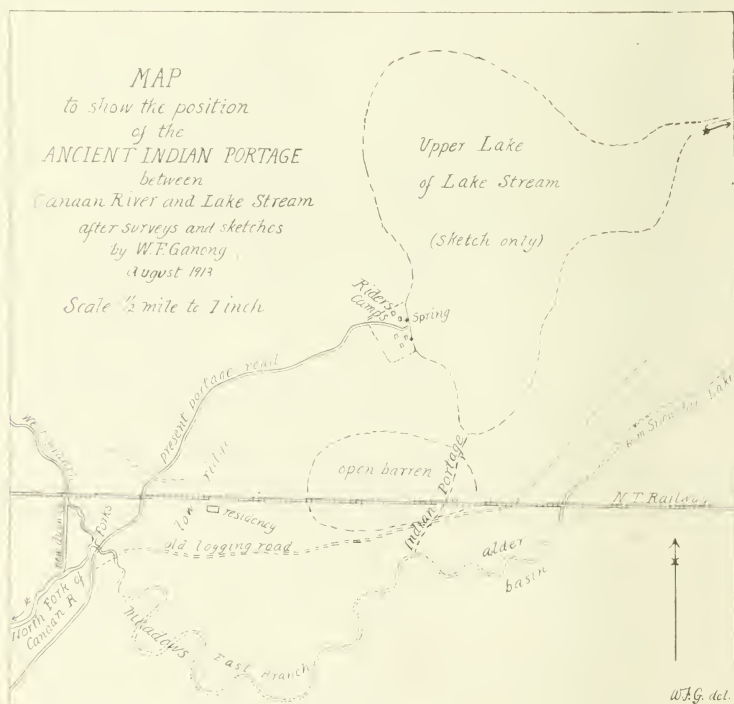
then deviated to the westward, there is also I think no doubt, for the original "blas'd path" was meant to go not primarily to Petitcodiac, but, as the plan shows, to the new lots recently laid out on the rich lands at Butternut Ridge; and as these lots lay to the westward the road had to go there. The relations of road and Indian path thus far would seem to be this — the surveyor who blazed out the trail to Butternut Ridge took advantage of the well-travelled Indian path as far as its general direction led towards the new lots at Butternut Ridge (the present deviation at the Canaan River itself being recent and made to secure a better bridge site), but when the Indian path was found to be bearing too far to the eastward he left it and made a new trail. Furthermore I believe, we can locate the very place where this deviation occurred, for in matching up the plan of 1809 with the modern maps we can see how both trail and road, as shown by the accompanying large map, take a somewhat direct route towards the Petitcodiac for about two miles, and then swing somewhat abruptly out of that direction, which presumably the Indian path kept; and this particular turn in the present road, as I know from my own observations, is much more marked on the ground than it is on the map. Beyond Butternut Ridge the new road had to be continued to Petitcodiac, and did not again meet the Indian trail until near Bennets Brook.

As to the Petitcodiac end of the portage, that I believe was at the mouth of Bennets Brook, with an accessory trail across to the main Petitcodiac, as shown by our large map. This part of the subject, however, I reserve for further study; and I hope to report thereon next year in connection with a Note on the Petitcodiac.

As the foregoing Note will show, the navigation of the Washademoak to the Saint John is easy, at least at fair water, though apparently it offers difficulties when the river is low. The way to Quebec probably did not always lie around by the mouth of the Washademoak, but crossed by a portage from below Picketts Cove on Washademoak Lake to Mill Cove on Grand Lake, thence taking the route through Maquapit Lake and Loders Creek, saving much time and distance. The use of such a portage would explain the occasional confusion in the French records between Washademoak and Salmon River waters, and the way in which the Washademoak is sometimes made to empty into Grand Lake on French maps.

(c).— *The Indian portage from the North Fork to Lake Stream.* In studying these streams I found that an Indian portage between them is well known by tradition to the older

residents of Washademoak and Salmon River, although it seems to have escaped mention entirely in any records or upon any maps. It could not, of course, have had great importance, since the streams it connected were no part of any through route of travel. It was doubtless, however, a prominent hunters' portage, one of those used by the Maliseets of the Saint John in their search for game or their pleasurable wanderings along our fine watercourses. We



can well believe that a round journey from the Saint John through Grand Lake, thence along Salmon River, up Lake Stream, across by the portage to North Fork and down that stream and the Washademoak to the Saint John again, with a lingering break in the journey at the charming campground beside the great spring at the Upper Lake (page 6 earlier) formed a favourite round trip in aboriginal days; and it is one which our own vigorous youth might repeat to their pleasure and profit in times of good water. In full belief that the

portage was worth recovery, I made a study of the surroundings in August, 1913, with some surveys presented on the accompanying map. Since then I have gathered all the additional information I could concerning the place.

The East and West Branches of North Fork stream come together in an extensive open natural meadow a little south of the New Railway, as shown by the map. Just at the Forks, and a little way up the East Branch, the meadow is high, dry and firm,—sufficiently so for the growth of bushes, brambles, and dry mosses, and to form an excellent landing (in a cove just up the East Branch) and a very good camp ground. Here a portage road, coming up the North Fork, crosses the East Branch, runs over a hundred yards of meadow to upland, ascends gradually a marked ridge and then keeps on high ground all the way to the lake by a route shown from survey on the map. On the highest part of this ridge stands the abandoned Residency (used in the building of the railroad), and off to the eastward the railroad crosses an extensive open bog-barren, beyond which it comes to upland again, and the valley in which the East Branch crosses the railroad. The East Branch itself above the Forks is an extremely winding stream of deadwaters in meadow swinging occasionally close to the ridge and easily navigable for some distance,

As to the position of the old Indian portage, the evidence is somewhat conflicting. Chief James Paul of Saint Marys, the best informed of the older Maliseet Indians, has told me that formerly he had a hunting camp on the Lake where Rider's camps now are, and that he used the portage frequently on his hunting trips. He says that the portage started exactly from the Forks, and ran directly, crossing the open barren, to the southern cove of the lake. Mr. I. T. Hetherington, earlier mentioned for his interest in these inquiries, told me at first that the portage started from the Forks; but later he interviewed an old resident of the North Fork who knows the place and remembers the portage well, and was assured by him that it left the East Branch about three-fourths of a mile up from the Forks, reaching the lake about fifty rods east of Rider's camps. Quite independently of this testimony, Mr. S. E. McDonald, another of my kind and interested correspondents, has sent me information which seems conclusive. He tells me that he knew the Indian portage well in his youth, when it was called by the old men, the "Indian carry." It left the East Branch at a bend, about one mile up from the Forks and ran directly up a gentle slope to the lake, crossing the end of an open bog barren

the distance being, as he remembers, not much over one-third of a mile. He also says that in those days a part of the old portage path was in use as a regular route to the lake, to which the residents of Canaan went each year to gather cranberries. Ascending the North Fork either by lumber road or canoe, they would take an old logging road that left the Forks and ran between Lake and East Branch as shown by our map, and would follow this to the crossing of the Indian trail, when they would take the latter to the Lake. He adds furthermore that an Indian, known as Governor Francis, once described the old trail to him as situated in this position, while James Paul himself once, on the spot, actually pointed out this path as the old Indian trail. Mr. McDonald thinks that the path can still be traced, and that it is kept open in part by game. As to its exact position, he can give no more definite information than is contained on the accompanying map, which unfortunately is no more than a crude sketch so far as the East Branch is contained. I descended this branch from the railroad in a canoe, intending to make a survey to the Forks, but found the navigation of the upper part so difficult, because of the alders, that it required all of our energies simply to escape from them. Evidently the portage did not start in or above this part. Below, however, the stream, though winding, is comparatively easy of navigation. Unfortunately at that time I had not the knowledge of this portage, supposing that it started from the Forks, so that I did not examine the localities with care, and the starting point may not be accurately located on my map.

In view of the very definite and detailed character of Mr. McDonald's information, in conjunction with the known accuracy of the abundant other data he has sent me, I have no question that he is correct, and that the ancient Indian portage had the general position indicated by his description and on the map. As to the apparently different testimony of James Paul, I believe that is very easily explained by the supposition that, after the cutting of the logging road from the Forks, the Indians made use of it as a direct easy carry instead of taking the much longer course of the small and winding stream; and this I take to be the portage direct from the Forks that he means. As to the new portage road, shown on the map from survey, that is known to be recent, having been made by Mr. Rider some twenty years ago.

132.—THE REMARKABLE TWELVE-HOUR TIDES OF BUCTOUCHE.

Read in Abstract June 10, 1911

Several years ago I found on an old plan of Buctouche, made by the surveyor Watson and preserved in the Crown Land Office at Fredericton, the following Note:

"The Tides are intirely governed by the Winds when it "sets into the Harbor and blows fresh it does not ebb, on "the contrary when it blows fresh out of the Harbor it "does not rise: in Calm weather it rises & falls once in about 24 Hours."

The latter statement, that in calm weather the tide rises and falls only once in twenty-four hours, I have long desired to investigate, but so many are the interesting things to be done in New Brunswick that it was not until July, 1912, that I was able to visit Buctouche for the express purpose of observing the tidal phenomena. I went there with the intention of making, by aid of an unsuspecting brother who was my companion, a continuous record of the tidal movement right through two complete cycles, that is night and day through forty-eight hours. I soon discovered, however, that such a study required appliances and conditions which I could not then command, and I was obliged to defer the measurements until another occasion. Nevertheless, my visit was by no means barren, for I had the following experience. On July 28, 1912, we were camped about a mile above Buctouche en route to the head of tide at Coates Mill, some ten miles above on the River. We observed a high tide in the early morning, about six o'clock, and, having plenty of time, we decided not to face the ebb current, but to wait for the flood which would ordinarily have been due to start about twelve o'clock. We waited, however, until after three, and then, as the tide was still ebbing, we set out, made our way by pole and paddle up to Coates Mill, and camped at tide head close beside the river bank. The tide did not rise at all that evening, but when we stepped from the tent

the next morning about six o'clock, the river was brimming full with a very high tide,—an observation which I made with deep satisfaction in thus experiencing for myself the truth of Watson's statement. A resident of the place told us that this was the usual phenomenon, though at other times there were two floods instead of one in the twenty-four hours.

Desiring still further information on the matter I wrote to Mr. Edward J. Smith, Fishery Guardian at Buctouche, a man familiar with the tidal movements at that place, and he with the greatest courtesy, has sent me much valued information in response to my many inquiries. In synopsis, his testimony is as follows: The tides in Buctouche Harbour and River are greatly influenced by the winds, but aside from this it is a fact that in general the spring tides, at the new and full moons, flow twelve hours and ebb twelve hours, (exactly double the usual length of ebb and flow), thus making only one high tide in twenty-four hours, while at the neap tides, during the moon's quarters, the tides flow and ebb in six hours, the usual way. Sometimes, in the Fall of the year, these twelve-hour tides will last continuously from new to full moon, the six-hour tides being entirely omitted. The change from the twelve to the six hour tides is rather sudden, though a day is apt to intervene in which there will be no tide proper at all, but only a rise and fall of four or five inches seven or eight times in the day. During the prevalence of the twelve hour tides, there are signs of the six hour influence manifest in a slackening of the tide out in Buctouche Bay, but this does not appear in the Harbour or River, where the ebb and flow are continuous throughout the twelve hours. There appears to be no recognized local explanation of the phenomenon, aside from the general supposition that it is due to peculiarities in the arrangement of Buctouche Beach, though somewhere I have heard or read the suggestion, which seems more probable, that it is due to the way in which two tides meet in Northumberland Strait, after passing around both ends of Prince Edward Island, a matter which can of course be tested by simultaneous observations in

neighboring places. There is, however, one fact about the vertical range of the tides, which may help in the explanation of the twelve-hour phenomenon, viz., while the ordinary spring tides range vertically about six feet, the neap tides range only about two feet.

Mr. Smith adds that the tides of Buctouche are very much affected by the winds, though presumably the phenomena in this respect are not essentially different from those in other shallow bays of the coast. Thus, a high wind from the north or northeast will not only drive the spring tides to a height of ten feet, but if persistent will keep the tide from falling appreciably at all. Since no other wind has this effect, and since Buctouche Bay does not open northward but southward, it seems plain that the effect must be due to the piling up of the waters of Northumberland Strait and not of the Buctouche alone.

Evidently in these phenomena we have a most attractive subject for exact investigation. Some alert young resident of Buctouche, constructing for himself a simple self-recording tide gauge, has here the opportunity to lay the foundation for a scientific education and a reputation in scientific research.

Needless to say I have looked with interest to see what mention is made of these anomalous tides in the "Tide Tables for the Eastern Coast of Canada," and in other writings of Dr. W. Bell Dawson, the Superintendent of the Tidal Survey of Canada. But I have found only the following, which I copy from the Tables for 1914. It is under the heading, "Current in Strait," on page 58:

The tide throughout the region is characterized by a marked diurnal inequality. This feature of the tide is under the influence of the declination of the moon; and it is most pronounced when the moon is in high declination, north or south of the equator. The period in which this variation recurs is the tropical or declination—month, which is over-run by the synodic month of the moon's phases. Hence when the variation is greatest, it occurs sometimes at the spring tides and sometimes at the neaps. The turn of the current in the strait has thus an appearance of great irregularity, which is usually attributed to the wind, whereas in reality it is almost wholly astronomical.

THE MICMAC INDIANS.

The student of Indian ethnology may look upon the Micmacs as only a little tribe, of small moment in the sum of aboriginal history, but, spread out along the northeastern shores of the Atlantic, they were the first of all American Indians to come in close contact with the whites, and today they are the only Indian tribe in all America that has held its own in numbers; its members are as many as when the Europeans first saw them. In this statement there are, of course, only the estimates of the early missionaries, LeClerq and Baird, to guide us, but the fact seems well established. Father LeClerq, laboring in Gaspe, the northern reaches of their hunting grounds where their number was always few, thought in 1680 that his "Gaspesians" numbered no more than 500, but Baird at an earlier date (1611) and nearer the center of their settlements in Acadia, estimated them at 3000 to 3500. In 1871 Hannay in his history of Acadia, placed the number at "nearly 3000," and adds, "it is doubtful if their numbers were ever much greater." Dr. Dionne, the distinguished historian of Quebec, says that in 1891 the Micmacs numbered 4108; Father Pacifique in 1902 made a personal enumeration of the tribe and placed the number at 3850 in Canada and 200 in Newfoundland. Today, according to Father Pacifique and the last official census, there are 4319 members of the tribe, of whom only 230 live in Newfoundland, and about 15 in the United States.

It is thus very evident that the tribe has been one of extraordinary vitality and has perpetuated itself and even multiplied in the face of much the same conditions which brought about the depopulation of every other aboriginal people of this hemisphere.

The Micmacs, too, hold to their original soil. Too many of our aborigines have been shifted about, the shuttlecock of the white man's designs, and find themselves today far away from their old hunting grounds. The Micmac country was the extreme orient of the Algonquins, and in the historic confederacy of this Algie stock which once covered half the continent, they were the "youngest brother," their land Migmagig, the "country of friendship." The elder brother was the Abenaki to the south and west, while the "father tribe" was the Ottawa, their land the "land of their origin."—*Extract from "The Micmac Tercentenary" by John M. Clarke, in New York State Museum Report, 1911.*

ARTICLE II.

CHIPPED AND FLAKED IMPLEMENTS OF NEW BRUNSWICK.

BY WILLIAM MCINTOSH.

This article is the second of a series of short papers intended to briefly describe and illustrate the New Brunswick Stone Age material in the Museum of the Natural History Society of New Brunswick.

The Society has been fortunate in having as members, Dr. L. W. Bailey, Dr. Geo. F. Matthew, the late S. W. Kain, Prof. W. F. Ganong, David Balmain and Duncan London. These gentlemen have either contributed articles on New Brunswick archaeology or presented specimens to the collection in the Museum. Many others who have found Indian relics in various parts of the Province have generously donated them to this Society.

During the past four years, the curator, assisted by some of the members, has spent a part of each summer in archaeological research. The specimens which have accumulated from these various sources now number several thousand.

The collection is especially valuable because we have a record of where almost every specimen was found, as well as the collector's name.

The aboriginal implements of New Brunswick have a wide range in origin and use. In a broad way, they may be classed as chipped forms of stone, pecked or polished stone, earthenware or clay articles, implements and ornaments of bone, ivory, horn and shell, and those of wood and bark. In this article, only the chipped and flaked stone implements will be considered. Of these, the Museum possesses nearly one thousand examples, the larger number of which are the flaked blades usually classed as arrow and spear heads.

Arrow and Spearheads.—It is difficult to precisely classify these, as it is now known that many of the so-called arrow and spear heads were used as knives, drills and scrapers. A number of arrow-like forms in the collection are so bent or one-sided that they could not be thrown or shot with precision. It is quite reasonable to suppose that an arrow might be used as a knife or scraper, and we have abundant proof to confirm this. An early writer speaking of western arrow-points, says, "If no knife is at hand, they use them also to skin the animals they have killed." Until very recently a number of western tribes employed as knives blades of chipped stone, identical in form with what are usually called arrow and spear heads. They are used inserted in short bone or wooden handles.

The writer has been unable to find any mention of stone-headed spears in the early accounts of contemporary European historians or in the Indian legends of this locality. On the other hand, we find the bone harpoon or spear and the stone knife frequently spoken of in history and legend. It is possible the larger blades were more generally used as knives, rather than as spear heads.

In the flaked blades of New Brunswick are found nearly all the common American types and the workmanship compares favourably with the stone work of other eastern American peoples.

The materials of which these articles are made are nearly all found in the Province. Many of the finest specimens are of felsite, or red jasper, small boulders of which are found on the shores of the lakes and rivers of central New Brunswick, probably washed out of the carboniferous conglomerates. On many camp sites, these boulders, both broken and whole, occur in such numbers as to leave little doubt they have been brought to the place by the prehistoric implement maker.

About sixty-two specimens, including some of the smallest arrowheads in the collection, are made of milky quartz which is common in many parts of New Brunswick. A number of these implements are made of chalcedony and carnelian, chips and fragments of which are found on many camp sites. Much



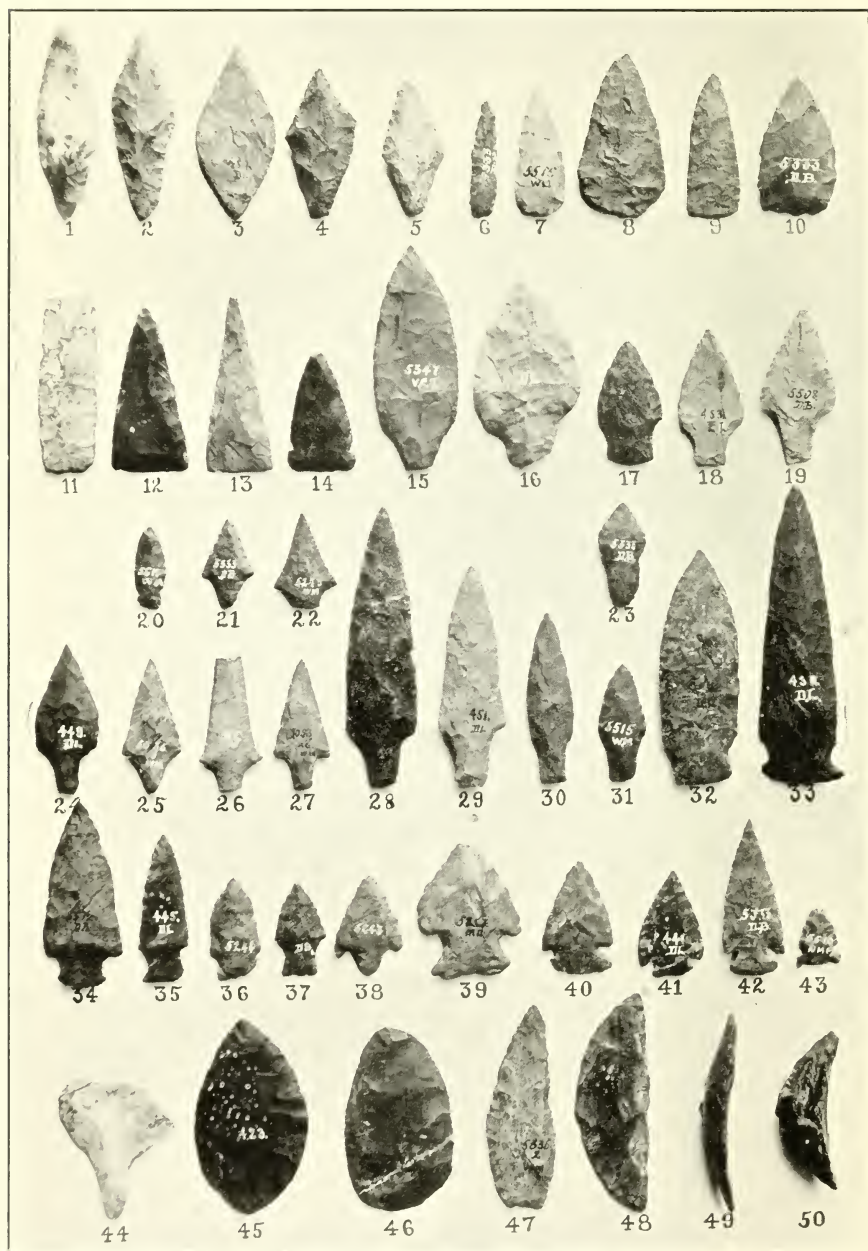


PLATE I.

of this material was probably obtained at the aboriginal quarry on the south side of Washademoak Lake, described by Dr. G. F. Matthew.*

On the plates accompanying this article are shown types of the flaked blades found in New Brunswick. On Plate I none of the specimens illustrated are over four and three-quarters inches in length.

A very large number of implements in the collection may be described as leaf-shaped. Examples are shown in Plate I, Figs. 6-10, and Plate II, Figs. 1-7. They range in length from one and three-eighths to eight and five-eighths inches. In this group we find nearly all the larger stone blades, and some of these are beautiful examples of the aboriginal implement maker's art.

Figs. 1-3 are leaf-shaped blades pointed at both ends. The collection includes twelve examples of this type ranging in length from one and three-quarters to six and one-quarter inches. Fig. 1 is a fine specimen of quartz, three and one-eighth inches in length, probably used as a knife.

Fig. 2, of felsite. The specimen is typical of this class, eight of the twelve points in this group being similar to it in outline.

Fig. 3, felsite, a slightly broader form. Only twelve lozenge-shaped blades (Figs. 4 and 5) are in the collection and these grade into the next group.

Fig. 11 shows part of a long, narrow blade with straight, parallel edges two and three-quarters inches in length. The collection contains fourteen broken specimens of this type, all found in central New Brunswick. They are made of felsite; the rock is probably local.

Figs. 12-13 show types of the triangular blades found in New Brunswick. The twelve specimens in the collection grade into the forms shown in Figs. 9 and 10. The base in each is thin and chisel-like but shows no evidence of having been used as a chisel. Four are of milky quartz, one of jasper, and four of felsite.

*Royal Society of Canada, Proc. and Trans. 2nd series, Vol. 6, Sec. 4, p. 61.

The collection does not contain specimens of triangular equilateral arrow points so common in some sections.

Fig. 14.—A point differing little from the preceding one, except that it is notched. This form is of rare occurrence.

Fig. 15-31 show a number of shouldered blades,—310 specimens or nearly one-half the blades in the collection belong to this class. They occur in a great variety of material, finish and size, and are the common "arrow and spear heads" of the region.

Fig. 15 is thin and finely finished, found near French Lake on the Oromocto River. It is three and five-eighths inches in length. The material is gray felsite.

Fig. 16.—A short, heavy, well-made blade of gray banded felsite, strongly suggestive of the heavy stone spear-heads used by the Eskimo and not at all common in this region.

Fig. 17, 18, 19, 24, are typical specimens of a common form, showing slight differences in length, breadth and proportion of parts.

Fig. 20 is one of the smallest points in the collection, one and one-quarter inches in length.

Fig. 21 is a finely proportioned arrow-head of an unusual shape, from Indian Point.

Fig. 22.—A beautiful arrow-head from central New Brunswick. The edges are concave and the point very sharp. A portion of the stem is missing.

Fig. 23.—The collection contains nine short, thick arrow-points in which the stem is longer than the head. They are all from the lake region of central New Brunswick.

Fig. 25 is much like Fig. 21 in outline, but thicker. The collection contains eight specimens. This form gradually merges into preceding and succeeding forms.

Fig. 26.—One of the most beautiful arrow-heads in the collection. Although broken, it is remarkable for its symmetry of outline and fine flaking. It is a beautiful example of the aboriginal stone-worker's art. Found at Maquapit Lake.

Fig. 27.—Is representative of one of the most common forms, which vary greatly in size. The specimen figured is exactly two inches in length.

Fig. 28.—One of the largest shouldered blades in the collection, four and one-half inches in length. It is a translucent, silicious sandstone, amber coloured at the point, and carnelian red at the base. The colours blend one into the other, producing a blade of unusual beauty.

Fig. 29 is three and one-half inches in length, of light gray felsite.

Fig. 30.—A very slender example from Grand Lake.

Fig. 31.—Is broader and shorter, a variation of Fig. 17, and one of the very common types.

Figs. 32-37 show examples of notched blades found in New Brunswick. The collection contains sixty-one specimens which belong to this class. They vary much in size and form.

Fig. 32 is very much like Fig. 15 in outline and size, but a much heavier blade, six and three-quarter inches in length, and is made of compact volcanic rock.

Fig. 33.—This is a well made implement of red jasper, four and three quarter inches in length. This and the preceding specimen were found at Maquapit Lake and are unique.

Figs. 34-37.—Are typical of this class of blade, and almost every possible variation within the limits shown by these four figures occur.

Figs. 38-42 show types of barbed arrow-heads found in the Province, the collection containing twenty-one examples. Some of these are beautifully made and are not surpassed by any flaked implements found in eastern North America.

Fig. 38 is an unusual form of which this is the only example. It is one and five-eighths inches in length, of compact silicious sandstone.

Fig. 39.—This blade is unique. It was found on the Jemseg and differs in shape and material from all the arrow-heads in the collection. It is a type common in some Iroquoian areas and it is possible it may have been brought here by a Mohawk war party.

Figs. 40, 41, 42.—Are all from central New Brunswick and are typical of barbed arrow-heads of the region.

Fig. 43 is the only stemmed, notched and barbed arrow-head in the collection. The stem and part of one of the barbs is

missing. It was found on an old camp site at French Lake by Miss Norma Fenton during the past summer. It is one and one-eighth inches in length and is made of gray mottled agate.

Drills or Perforators.—In the Museum are three implements with narrow elongated blades and expanded bases. These are usually spoken of as “drills or perforators.” Archaeologists are not agreed upon this point. They may be a peculiar type of arrow-head. Fig. 44 shows the best specimen in the Museum. In New Brunswick we find on camp sites pointed flakes in a variety of sizes and shapes. In many of these the point is worn, showing evidence of having been used for boring. They are not finished implements, simply flakes, which by reason of their pointed shape were suitable for drilling or perforating. They were used until the point was dulled or broken and then thrown aside.

Knives.—It is probable that most of the larger arrow or spear-like blades were used as knives. Le Clercq speaks of the Indians wearing knives suspended from the neck. These were the dagger-like blades used by the men. About the camp, a flake of quartz or felsite served as a temporary knife. Scores of these are found on the old village sites. Well finished, broad, leaf-shaped or oval blades such as are shown in Figs. 45, 46, are found in small numbers. These usually have a finely flaked keen cutting edge. They were probably used by the women, mounted in the same manner as the Ulu or woman’s knife of the Eskimo.

Fig. 45 is of red jasper, three and one-eighth inches in length.

Fig. 46.—Brown felsite, three inches long.

Fig. 47.—There are several curved blades in the collection. Possibly these were used as knives. The specimen figured is three and one-quarter inches in length.

Fig. 48.—A handsome, somewhat longer blade. Judging from the specimen it may have been mounted and used as the Eskimo Ulu. It is three inches in length.

Fig. 49.—The collection includes a small number of bent blades. The figure shows a side view of one of these. It is



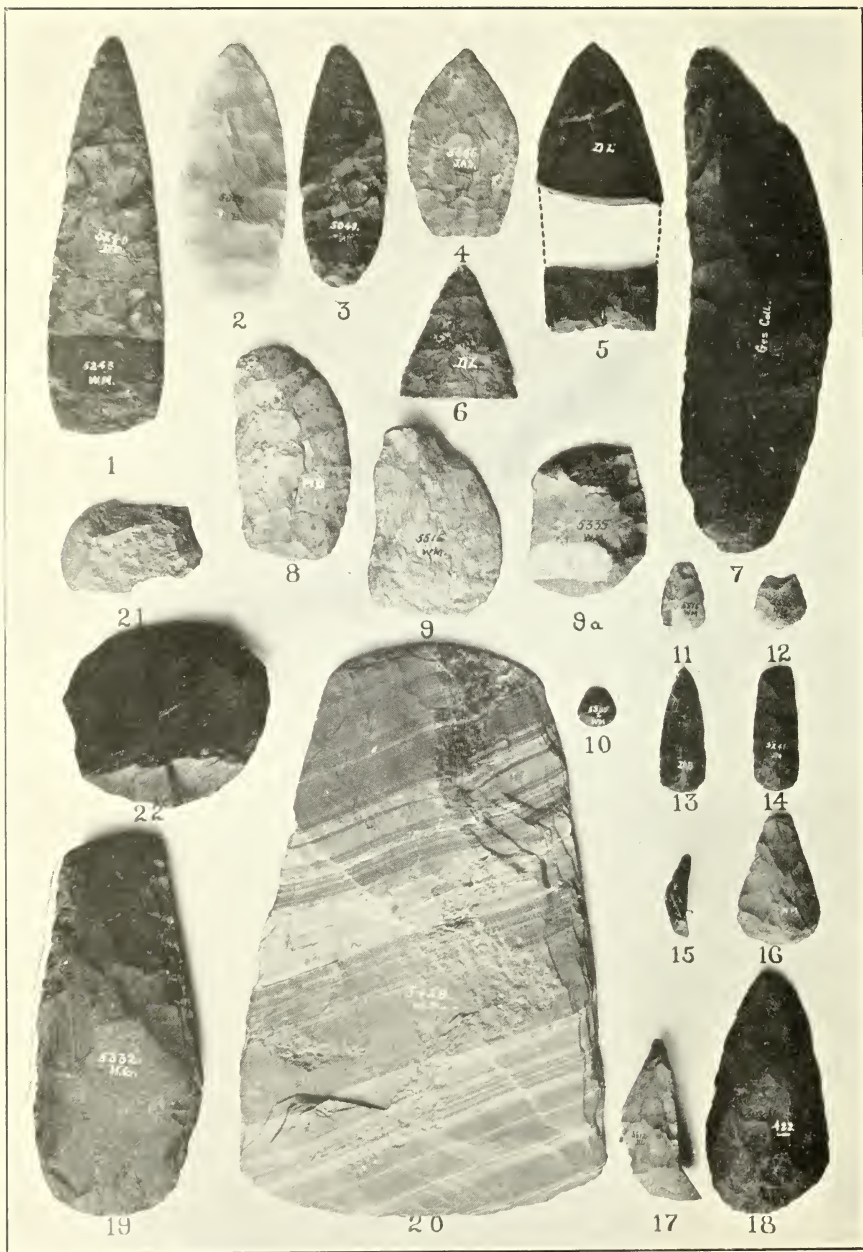


PLATE II.

three and one-quarter inches in length, one and one-quarter inches in width, leaf-shaped, almost exactly like Fig. 1 in outline. Many believe these were used as knives.

Fig. 50.—Side view of a carefully flaked object, two and one-half inches in length, one inch wide, and five-eighths of an inch through. It is almost too sharp at the ends for a scraper but may have been used as one.

Plate II, Fig. 1, is the largest straight blade in the collection, eight and five-eighths inches in length, two and one-half inches in width, one-half inch thick, probably petrosilex. The specimen is broken into five pieces. Four of these were found at Indian Point, Grand Lake, by Mr. David Balmain, about twenty years ago. Sixteen years later, the remaining portion was discovered by the writer who did not at first recognize it as belonging to the blade as the colour was a fresh reddish brown, while the other parts were weathered to a brown gray. The discovery that they were parts of the same blade was made almost by accident.

Fig. 2.—A very beautiful specimen of white semi-translucent quartz, seven and one-half inches long, two and three-eighths inches wide, and one-quarter inch thick. Found in eastern New Brunswick.

Fig. 3 is a remarkably handsome blade of compact volcanic rock, beautifully clouded and spotted. It is two inches wide and five and one-quarter inches in length. From Grand Lake.

Fig. 4, from the Oromocto River, is remarkable for its great width, being two and one-half inches wide and four and one-eighth inches in length, very thin and finely finished. This is the first unbroken specimen of this type which we have obtained. It enables us to recognize as probably belonging to this class a number of points and bases of large blades characterized by their great width, thinness and fine finish. Examples of these are shown in Figs. 5 and 6.

Fig. 7 is the largest flaked blade in the collection, measuring three and one-quarter inches, by eleven and five-eighths inches. It is made of dark red jasper and is a splendid example of aboriginal workmanship. It formed part of the Gesner Collection and was found in New Brunswick. This is all we know of its history.

Fig. 8.—A heavy curved blade, possibly mounted as a Ulu or woman's knife. From central New Brunswick.

Fig. 9.—Not unlike the last in outline, but a much thinner blade. Made from a single large flake, the edge being chipped and worn as through much use. These rudely chipped blades which show evidences of having been used as knives, are very numerous on ancient camp sites. There are about twenty-five or thirty in the collection.

Figs. 9a-18 show some common forms of stone scrapers found in New Brunswick. The collection contains about 127 well made examples. The writer has classed as scrapers those flaked stone implements which are flat or concave on one side and convex on the other, with a rounded end, giving a curved scraping edge. Among the uses of the scraper, that of dressing hides probably took first place. They were also employed in wood-work, sharpening bone implements, scraping roots, etc. It is interesting to note that the Eskimo are using scrapers almost identical with those in our collection. These are mounted in bone and wooden handles. There is no doubt the New Brunswick scrapers were used in the same manner as the Eskimo use them at the present time.

Fig. 9a is a good example of the larger scrapers. The material is a very fine gray sandstone or felsite, two and one-half by three and one-quarter inches. Many scrapers are irregular in outline like this one, but all have well finished cutting edges.

Fig. 10 shows a beautiful little scraper, seven-eighths of an inch in length. One of five found on an old camp site on the Portobello Stream. These five scrapers are made of red jasper and are almost exactly alike in size and appearance. The collection contains about twenty-two of these small, almost circular scrapers.

Figs. 11, 12, and 15 are about one and one-quarter inches in length and are typical of a large number of medium sized scrapers.

Figs. 13 and 14 are beautifully finished implements made of banded red and black jasper-like rock. They are two and three-

quarter inches long, one inch wide, and eleven-sixteenths inches thick. The measurement of both is exactly the same, but, as will be seen by the figures, they differ somewhat in outline. The collection contains nine of these thick, narrow scrapers, and a large number are about the same in width and thickness but shorter.

Fig. 16.—The specimen figured measures two and seven-eighths by seven-eighths by one-half inches. This is a very common type, perhaps nearly one-half the scrapers in the collection being of this broad, thin class.

Fig. 17.—Is a side view of one of the narrow, thick forms, but the specimen is more concave than usual.

Fig. 18 is the largest scraper in the collection, two and three-quarters by five and three-eighths, barely an inch in thickness. It is perfectly flat on one side.

Figs. 11, 16, 18 are all of the same type, proportioned alike, differing only in size.

Fig. 19.—Specimens almost exactly like this have been called hoes or agricultural implements by American archaeologists but the four specimens in our possession show no signs of wear and the writer is of the opinion they are partly finished chipped celts. The collection contains a number of chipped and ground celts much like these.

Fig. 20.—Is an interesting object found by the writer on an old Indian camp site at Washademoak Lake. It is made of light gray slate, beautifully banded with white, is twelve and one-half inches in length, eight and one-quarter inches in width at one end and five and one-quarter at the other and is not more than three-quarters of an inch in thickness. It is carefully chipped, flaked and pecked. It is too thin to be used for heavy work. Upon examination, you feel that the maker intended it for ornament rather than utility, perhaps a gorget or a ceremonial object.

The collection contains a number of objects which do not belong to any of the classes described, one of these is shown in

Fig. 21. The end is rounded and beautifully flaked to a smooth cutting edge, it was probably used mounted in a handle.

On almost every ancient camp site are found numbers of rejected fragments or cores from which the prehistoric implement maker has struck the material used in his work, many of these cores or "turtlebacks," are nearly circular and are often mistaken for implements by collectors. A typical example is shown in Fig. 22.

Chipped and Flaked Implements in New Brunswick in the Collection of the Natural History Museum, St. John, N. B., Dec. 10, 1913.

Flaked blades commonly classified as "arrow and spear heads."

Leaf shaped of which Fig. 7, Pl. 1, is the most common form	188
Long narrow " " " 11, " " " " " "	14
Triangular " " " 12, " " " " " "	12
Lozenge " " " 5, " " " " " "	14
Stemmed blades " " 29, " " " " " "	310
Notched " " " 35, " " " " " "	61
Barbed " " " 42, " " " " " "	21
Notched, stemmed and barbed of which Fig. 43, Pl. 1, is the most common form	1
Unclassified	56
<hr/>	
Flaked blades.....Total	677
Scrapers.....	127
Rough flakes which have probably been used as knives.....	36
Crude implements Paleolithic in type.....	60
Miscellaneous including chipped axes.....	76
<hr/>	
	976

ARTICLE III.

NOTES ON NEW BRUNSWICK WEATHER FOR 1912.

BY D. LEAVITT HUTCHINSON.

January.—The distinctive feature of the month was the steady and extremely cold weather with but two brief intervals of thawing temperatures. Snow fell on twelve days, light rain on three. At St. John, the average temperature was the lowest since 1888. Temperatures below zero were recorded on twelve days, attended by thick vapour over the Bay. An exceptionally heavy gale from the southeast through southwest to northwest occurred on the 9th and 10th; at Point Lepreaux it reached hurricane force and some local damage resulted. At the close of the month the depth of snow ranged from three inches near the coast line to two feet farther north. Highest temperature 51 at Sussex; lowest 31.5 below zero at Fredericton.

February.—A month of steady though not extremely cold weather. Excepting between the 9th and 12th, few or no zero temperatures were recorded. The only thaw occurred with the heavy rainfall of the 22nd. Snow fell on eight days, snow and rain on one, while the remaining days were mostly fine and bright. A heavy southeast through southwest to northwest gale on the 22nd and 23rd, and a gale from southeast and east on the 27th were the only storms of the month. The last mentioned was accompanied by the heaviest snowfall of the winter in New Brunswick. Highest temperature 48.7 at Grand Manan; lowest 29.5 below zero at St. Stephen.

MARCH.—Weather was of a very wintry type, rivers and lakes remained ice-bound with little prospect of an early opening. In southern New Brunswick good sleighing prevailed until the 15th, when a heavy rainfall put an end to

it. In northern New Brunswick the snowfall was excessive and at the close of the month a considerable depth was still on the ground. Ice firm in the River. Highest temperature 55 at Moncton; lowest 21 below zero at St. Stephen.

APRIL.—During the greater part of April fair, cold, backward and at times wintry weather prevailed, vegetation showing little sign of life. Rivers and streams were unusually late in opening and the spring freshets were checked owing to the lack of warm rains and seasonable temperatures. Roads bare of snow except near the North Shore where a heavy snowstorm prevailed on the 19th. Thunderstorms were fairly general on the 16th. St. John River opened on the 19th. Highest temperature 70 at Moncton; lowest 5 at Dalhousie.

MAY.—Mostly fair and comparatively dry weather was experienced up to the 22nd, but unsettled wet weather then set in and an excessively heavy rainfall occurred on the last three days, when in some localities over four and a half inches fell. A moderate southwest to northwest gale prevailed in the Bay of Fundy district on the 14th. Thunderstorms on the 24th and 25th were heavy and destructive in York County. Vegetation everywhere backward. Highest temperature 84.5 at Chatham; lowest 22 at Dalhousie.

JUNE.—Cold wet weather prevailed until the 18th, when fine and comparatively warm conditions set in, followed on the 30th by a return to cold with light frosts and flurries of snow in some localities. The total amount of rain recorded during the month was considerably less than the average. Severe frosts occurred on the 8th. Bright aurora on the 7th. Thunderstorms on the 21st and 26th. Highest temperature 93 at Chatham; lowest 30 at St. Stephen.

JULY.—During the first two weeks of the month the weather was generally fine, dry and extremely warm. In the interior and northern districts temperatures exceeding 95 were recorded in some localities between the 4th and 10th, and during this period thunderstorms of marked severity

caused considerable damage, and the fatalities reported were quite unusual. The remainder of the month was cold, wet and dull, and at times autumn-like. Highest temperature 98 at Chatham, lowest 36.5 at Sussex.

AUGUST.—A month of most persistent unsettled, wet and unseasonably cold weather. Thunderstorms were very heavy and destructive throughout the Province. The continuous heavy rains hindered farming operations and considerable damage resulted from the flooded rivers and streams. For cold, gloomy and wet weather the past summer leaves a record seldom surpassed. Slight earth tremors were reported from Charlotte and Carleton Counties on the 19th. Highest temperature 85 at Chatham, lowest 36 at Moncton.

SEPTEMBER.—Fine weather prevailed throughout the month while the mean temperature was below average in all districts. Frosts were remarkably infrequent and almost the total amount of precipitation occurred on three days. Winds were light and no gales occurred. Light snow fell in Carleton County on the last day of the month. Highest temperature 79.5 at St. Stephen; lowest 28.5 at St. Stephen.

OCTOBER.—The weather of the month for the most part was fair and mild. Rainfall varied from double the average in some localities to about average in others. Temperatures below freezing were recorded on the 16th, 21st and 30th. A moderate gale from southeast to southwest prevailed on the 13th. A stormy period occurred between the 24th and 26th with heavy rains and a southeast gale, maximum velocity of 60 miles an hour being registered at Point Lepreaux. Rivers, streams and lakes much above seasonal height.

NOVEMBER.—Fine, mild, pleasant conditions typical of Indian Summer prevailed during the greater part of the month. The snowfall was everywhere light, but on the North Shore and in parts of the interior sleighing was fair during the last two weeks, elsewhere the ground was almost bare of snow. A southeast to southwest gale occurred on the 8th, and a northeast gale on the 14th with a maximum

velocity of 60 miles per hour at Point Lepreaux, but in all localities the wind movement was considerably below average. No extremely low temperatures were recorded and the St. John River was open for navigation throughout the month. Highest temperature 67 at Moncton, and St. Stephen; lowest 11.5 at Fredericton.

DECEMBER.—An unseasonable fine, mild month with remarkably high winds. No severe cold spells were experienced and the snowfall was abnormally light. Near the coast-line the ground was practically bare of snow throughout the month, but fairly good snow roads obtained on the North Shore and in parts of the interior. Six gales occurred, that on the 19th being attended by excessively heavy precipitation. Pronounced earth tremors occurred on the morning of the 11th. Highest temperature 54 at Sussex; lowest 13 below zero at Chatham.

ST. JOHN OBSERVATORY.

WIND DIRECTION AND VELOCITY FOR 1912.

1912	N.		N. E.		E.		S. E.		S.		S. W.		W.		N. W.		C.	
Months.	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Total Miles
January.....	135	1,480	101	1,347	8	97	33	690	22	443	42	925	50	755	331	5,737	2	11,474
February.....	93	857	25	247	27	275	31	711	24	273	75	1,350	83	1,069	315	4,930	23	9,712
March.....	94	1,045	60	814	21	169	66	886	40	362	155	2,345	31	215	265	4,824	12	10,660
April.....	72	700	49	481	42	329	88	835	114	948	106	1,452	30	215	214	3,897	5	8,857
May.....	74	592	80	850	20	147	51	573	223	1,890	219	2,769	18	109	37	535	22	7,465
June.....	60	736	13	147	18	114	65	626	215	1,649	154	2,030	22	144	162	2,611	11	8,057
July.....	123	1,540	50	384	10	92	45	455	320	2,327	102	945	12	43	68	972	14	6,758
August.....	82	664	9	56	16	103	49	441	220	1,302	190	1,668	28	170	116	1,613	34	6,017
September.....	130	1,014	106	789	31	114	22	158	108	603	138	1,379	28	149	70	733	87	4,939
October.....	61	601	23	190	37	482	81	1,292	77	817	180	2,321	42	304	221	3,750	22	9,757
November.....	158	1,905	65	830	17	199	17	242	63	915	136	1,904	76	723	170	2,292	18	9,010
December.....	106	1,254	62	587	20	183	33	398	59	916	119	2,643	69	1,014	263	5,163	13	12,158
TOTALS.....	1,208	12,388	643	6,722	267	2,304	581	7,307	1,485	12,445	1,616	21,731	489	4,910	2,232	37,057	263	104,864

METEOROLOGICAL ABSTRACT FOR 1912.

ST. JOHN OBSERVATORY.

METEOROLOGICAL SERVICE OF CANADA.

Latitude, 45° . 16. ' 4.59. " N.Longitude, 66° . 3. ' 47.70. " W.

MONTHS. 1912.	BAROMETER.			THERMOMETER.			Cloudiness 0 = Clear 40 = Wholly Cloudy	Precipitation Rain and Melted Snow	Thunderstorms	Fogs
	Mean	Highest	Lowest	Mean	Highest	Lowest				
January.....	29.893	30.586	28.557	13.3	46.3	-12.7	5.3	3.72	0	0
February.....	29.754	30.304	29.001	20.3	43.7	-12	4.8	3.00	0	2
March.....	30.021	30.647	29.216	28.6	49.2	3.3	5.5	3.89	0	4
April.....	29.916	30.584	29.053	37.7	56.5	16.7	5.1	3.36	1	5
May.....	29.965	30.387	29.316	48.8	67.6	34.3	6.2	7.49	3	6
June.....	29.895	30.187	29.509	55.6	76.3	40	5.5	2.65	1	6
July.....	29.928	30.266	29.452	60.3	77.5	45	6.5	4.00	3	6
August.....	29.928	30.365	29.526	59.2	73.9	46	6.0	5.75	5	9
September.....	30.052	30.432	29.616	55	71.2	38.5	5.7	3.45	0	2
October.....	30.001	30.482	29.486	47.9	68	32	4.9	3.23	0	1
November.....	29.937	30.355	29.358	37.7	57.5	21.7	6.1	3.93	0	1
December.....	29.906	30.567	29.562	28.4	52.5	3.7	4.5	7.38	0	4

Mean height of barometer for year was 29.933, the highest reading 30.647 on 6th March, and the lowest 28.557 on the 9th January. The average temperature for the year was 41.1, which was 0.1 below the average of the past forty years. Maximum temperature 77.5 occurred on the 2nd of July and the minimum 12.7 below zero on the 13th January. Total precipitation 51.85 was 4.69 above average.

D. L. HUTCHINSON,
Director St. John Observatory.

NOTES ON NEW BRUNSWICK WEATHER FOR 1913.

BY D. LEAVITT HUTCHINSON.

JANUARY.—Phenomenally mild, spring-like conditions prevailed throughout the greater part of January. In southern New Brunswick the ground was generally devoid of snow. The St. John River was open in places and covered with poor ice in others. Trees budding and sap running. In the north, comparatively mild weather prevailed, with about three feet of snow in the woods at the close of the month, and lumbering conditions ideal. Six gales occurred, that of the 4th being the heaviest for many years. The wind reached hurricane force from the northwest with an hourly velocity of upwards of eighty miles at Point Lepreaux. Considerable damage and some wreckage was occasioned thereby, but the early warning of this severe storm must have prevented many disasters. Highest temperature 56 at Sussex on the 3rd; lowest 20 below at Dalhousie on the 28th.

FEBRUARY.—In marked contrast to the two preceding months conditions during February were decidedly wintry, and temperatures near and well below zero were of frequent occurrence. Snow fell on nine and rain on two days, otherwise fine bright weather prevailed. The gales of the month were unimportant. During the last half of the month, fairly good snow roads obtained in southern New Brunswick. At the close of the month, the snow covering ranged from six inches near the shores of the Bay of Fundy to two feet in the interior and greater depth in northern localities. Highest temperature 52 at Sussex on the 1st; lowest 25 below zero at Sussex on the 25th.

MARCH.—Dull, unsettled, mild weather was general throughout the month, although temperatures well below zero were recorded on the 8th. A remarkably heavy fall of

hard sleet occurred on the 26th, and the total precipitation for the month was much above the average. The snow covering was light in all localities, and in southern New Brunswick the ground was bare of snow after the 15th. Near the close of the month freshets were exceedingly heavy, roads were flooded, bridges carried away, and travel by rail delayed by washouts. The St. John River was open for navigation, excepting near Fredericton, where the ice was holding firm. Highest temperature 66 at Moncton on the 31st; lowest 20 below zero at St. Stephen on the 8th.

APRIL.—The weather was mostly unsettled and cool; light snow falls and flurries until the 20th, when a spell of fine, dry and unseasonably warm conditions set in, continuing until the 28th. Temperatures of 80 and considerably above were recorded in most localities between the 25th and 28th. It then turned cold and wet, with frosts on the last day of the month. The St. John River opened for navigation on the 1st, but was not entirely free of ice for some days; freshets on this river did not reach the normal. Wind movement was everywhere less than the same month last year and no gales of importance occurred. Highest temperature 85 at Chatham on the 25th; lowest 12 at Sussex on the 8th.

MAY.—May was unseasonably cold with an excess of dull, wet days. Temperatures well below freezing were general on the 2nd, and between the 15th and 17th. Rain fell on fourteen days; and there was a northwest gale and heavy rain with an extremely low barometer on the 30th. Highest temperature 88 at Chatham on the 6th; lowest 22 at St. John on the 16th.

JUNE.—Fine, bright, exceptionally dry, but unusually cool weather was general throughout New Brunswick. Coast fogs were light and infrequent. Slightly damaging frosts occurred locally in the River counties on the 10th and 23rd. Highest temperature 83 at Fredericton on the 11th; lowest 30 at Dalhousie on the 2nd.

JULY.—The greater portion of the weather of the month was fine and warm, rainfall in most places above the average, but fell in heavy showers and during the passage of thunderstorms; coast fogs were few and of short duration. Crops throughout the province, although somewhat backward, promise a good yield. Highest temperature 92 at Chatham; lowest 41 at Moncton.

AUGUST.—The weather of August was for the most part fine, warm and pleasant, no extremely high temperatures being recorded; nearly the total amount of rain fell on four days; light frosts were locally reported on the 26th. Highest temperature 90 at St. Stephen on the 16th and 18th; lowest 32 at St. Stephen on the 26th.

SEPTEMBER.—The weather during September was mostly fine and bright with a moderate and scattered rainfall. A heavy thunderstorm occurred on the 3rd. Freezing temperatures were recorded locally between the 27th and 29th. Trees retained their leaves, but the color was gradually changing. Highest temperature 90 at St. Stephen on the 3rd; lowest 27 at St. Stephen on the 28th.

OCTOBER.—Unseasonably mild, gloomy and wet, with a marked deficiency of bright sunshine and clear nights. Rain fell on twenty days, was much above average and excessively heavy in all districts between the 24th and 27th, causing abnormally high water in rivers, marshes and lakes. Light local falls of snow with a decided drop in temperature occurred on last day of the month. Moderate gales on the 2nd, 14th and 21st. Highest temperature 74 at St. Stephen; lowest 23 at Moncton.

NOVEMBER.—An exceptionally fine, open and dry month, the coolest periods being near the opening and close. During the interim, weather was phenomenally mild with occasional summer-like conditions. Only about one-third of the normal precipitation occurred. Very little snow fell and the ground was bare in most sections on the 30th. St. John, maximum for the month, 62, was the highest recorded for the past ten

years. Rainfall which was much under average, fell almost altogether on the 14th and 20th. Snowfall consisted of flurries at the end of the month. Moderate northwest gales on the 1st, 4th, 5th and 23rd; southeast on the 9th. Highest temperature 65 at St. Stephen; lowest 4 at Fredericton.

DECEMBER.—Unseasonably mild with bare ground in most localities till the 24th when more wintry conditions set in; sleighing then good for remainder of month. Temperatures well below zero in some districts on the 29th. Ice formed at head of St. John River on the 1st but navigation continued until the 8th. A heavy southerly gale on the 8th caused some local damage. In southern New Brunswick the snow covering at the close of the month ranged from two to eight inches. Highest temperature 52 at Sussex on the 8th; lowest 13 below zero at Fredericton on the 29th.

ST. JOHN OBSERVATORY.

WIND DIRECTION AND VELOCITY FOR 1913.

1913	N.		N. E.		E.		S. E.		S.		S. W.		W.		N. W.		Total Miles	
	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles		
Months.	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles	Hours	Miles
January.....	111	1,164	35	332	19	112	31	489	111	2,116	146	2,679	77	1,018	199	4,152	15	12,062
February.....	207	2,663	67	795	41	490	19	348	3	45	51	1,068	102	1,682	179	3,433	3	10,524
March.....	38	344	32	375	22	315	69	785	98	1,108	255	4,081	66	899	161	3,315	3	11,222
April.....	174	2,059	53	521	71	531	11	90	167	949	116	1,615	43	466	72	1,543	13	7,774
May.....	61	717	99	1,015	75	690	51	342	146	1,255	108	1,166	86	850	111	2,101	7	8,136
June.....	67	732	69	571	25	205	41	226	207	1,960	183	2,617	22	217	105	1,773	1	8,301
July.....	36	381	44	393	28	230	166	1,205	268	2,367	121	1,517	35	348	30	518	16	6,959
August.....	76	874	25	240	6	46	51	472	313	2,723	172	2,104	9	64	68	774	24	7,297
September.....	97	1,022	54	484	33	260	62	768	129	953	188	2,434	16	197	133	1,561	8	7,679
October.....	127	1,793	164	1,935	44	738	127	1,626	102	785	75	997	19	141	67	730	19	8,745
November.....	52	583	55	523	46	526	42	706	39	500	216	3,225	96	1,076	169	3,284	5	10,423
December.....	133	1,636	88	831	28	293	21	486	18	389	92	1,392	96	931	243	4,075	5	10,033
TOTALS.....	1,199	13,968	785	8,015	438	4,436	691	7,543	1,601	15,150	1,723	24,895	667	7,889	1,537	27,259	119	109,155

METEOROLOGICAL ABSTRACT FOR 1913.

ST. JOHN OBSERVATORY.

METEOROLOGICAL SERVICE OF CANADA.

Latitude, 45° , $16'$, $450''$. N.Longitude, 66° , $3'$, $47.70''$. W.

MONTHS. 1913.	BAROMETER.			THERMOMETER.			Cloudiness 0 = Clear 10 = Wolly Cloudy	Precipitation, Rain and Melted Snow	Thunderstorms	Fogs
	Mean	Highest	Lowest	Mean	Highest	Lowest				
January	30.064	30.791	28.647	28.4	51.5	- 1	6	4.27	0	3
February	29.895	30.374	29.266	16.2	43	- 10.7	5	2.69	0	2
March	30.075	30.858	29.205	32.7	52.3	- 4.8	6	7.60	0	3
April	29.985	30.447	29.257	40.2	61.4	19.3	6	2.89	0	4
May	29.959	30.475	28.957	45.8	65.5	31.3	6	3.64	1	0
June	29.957	30.272	29.493	55.6	73.7	41.3	5	0.56	2	3
July	29.901	30.227	29.505	61	80	52.3	5	3.55	4	9
August	30.038	30.422	29.724	59.9	77.2	47.2	5	2.76	3	11
September	30.134	30.533	29.713	54.6	70.2	36.3	5	2.14	2	3
October	29.992	30.584	29.400	54.9	69.3	30.2	8	5.95	0	7
November	30.089	30.883	29.492	39.5	61.8	12	6	1.37	0	1
December	29.904	30.594	28.816	28.9	50.2	8.5	6	3.73	0	1

Mean height of barometer for the year was 29.999, the highest reading 30.883 on the 28th November, and the lowest 28.647 on the 4th January. The average temperature for the year was 43.1, which was 1.9 above the average for the past forty years. Maximum temperature 80 occurred on the 30th July and the minimum 10.7 below zero on the 10th February. Total precipitation 41.15 was 5.15 below average.

D. L. HUTCHINSON,
Director St. John Observatory.

APPENDIX.

THE PRESIDENT'S ANNUAL ADDRESS.

LADIES AND GENTLEMEN OF THE NATURAL HISTORY SOCIETY
OF NEW BRUNSWICK.

It is now about eighteen years since I had the honor of addressing you on the occasion of your annual meeting to receive the report of the Council for the past year, and to elect office bearers for the year which is opening. So large a portion of a century will make a considerable change in the membership of a society like this, but some who may have heard that former address no doubt are still with us, and I also count upon some fresh auditors tonight.

It is usual for the presiding officer of this Society to review at this meeting the work of the Society for the past year, to say something of his own scientific work, or to make suggestions bearing on the future well-being of the Society.

The first topic has been so fully dealt with in the Annual report of the council that further words from me seem unnecessary. Upon the second I have on this occasion nothing to say; so I propose to address a few words to you on the past work, the present position and the future prospects of the Society.

The venture that the council of your Society made some years ago in the purchase of the Finn building has proved eminently successful, as it brought us legacies of much value, and gifts to the library, museum and rooms, and furnishes a center around which the traditions of the organizations may cluster. It is true that the conversion of a sumptuous private dwelling into a museum and lecture hall, has proved somewhat expensive, but the council has never lacked the funds necessary to secure all necessary improvements.

To form a proper conception of the important scientific work the Society has done during the past twenty years it becomes necessary to examine the volumes of the Society's annual Bulletin. Each number is divided into two parts, viz the Bulletin proper which was established by the Society for the purpose of publishing new contributions to knowledge, and the Appendix which consists chiefly of the annual report. Our purpose this evening is to deal mainly with the former.

In glancing through the volumes of the Bulletin one is saddened to meet the names of three members of the council who have passed from us in the past year, Dr. H. G. Addy, Dr. G. U. Hay and Senator Ellis. The last named has filled your presidential chair for the past eleven years and, from his having occupied it for so long a time, evidently with great acceptability. The high esteem in which Senator Ellis was held by the council and other members of this Society is voiced in the resolution passed by the council soon after his death, and communicated to the bereaved members of the family. Among the names of those who have contributed to the pages of our Bulletin none hold a more honored place than our late president Senator Ellis, whose chair I temporarily fill this evening, and who, had he been living and well, would have addressed you. In the past decade you have listened to his scholarly addresses of a scientific and literary trend, many of which either in whole or in abstract, are to be found in the pages of the Bulletin.

But there is perhaps no contributor to our work whose loss the Society will feel more keenly than that of the late Dr. George U. Hay. As yet there seems no one who can carry on his botanical work, nor one who is so familiar with the current requirements of the Society, especially as regards its monthly meetings and summer-field work. Quietly and steadily he has worked in the interests of the Society as is shown by the fact that hardly a Bulletin has been issued that has not shown by contributions to its pages his unflagging devotion to his favourite study of botany, and particularly that of his native province.

The Bulletin contains the names of about a score of members who have been contributors to its pages in the past twenty years. Some of these have gone to other fields of labor, while others have joined the "great majority," but the Bulletin will always tell of their devotion to Nature and their desire to unfold her secrets. Among former contributors to the Bulletin are Professor Philip Cox, now of the University of New Brunswick, who in 1808 sent us an important paper on the fishes of the province which in a subsequent year he follows up by one on the shrews, etc.

Mr. S. W. Kain was at this time secretary of the Society and in after years gave some valuable papers on wells, earthquakes, and the relics of the French period, of which latter he obtained quite a number for the museum.

About this time Dr. W. D. Matthew who was an honour student at Columbia University spent some time in lithological studies around St. John, chiefly on the crystalline and volcanic rock of this vicinity. He presented three contributions to the Bulletin on this subject.

Professor A. Wilmer Duff, in the "nineties," gave some attention to the tidal phenomena of the St. John river, at its summer level and wrote two papers on this subject.

Besides these there are several writers of papers that were printed in the Bulletin who might be described as occasional contributors. Such were two sons of Dr. L. W. Bailey, J. W. Bailey Esq. who gave a paper describing the great New Brunswick wilderness, and Dr. G. W. Bailey who wrote on the land snails of the province.

Others who may be mentioned in this connection are Mr. G. J. Trueman, who wrote about the marsh region at the head of Chignecto Bay and James Vroom, who told of our numerous species of violets. At a later date Dr. J. O. Green communicated a paper on the game birds of Miscou Island.

In 1903 and 1904 Professor L. W. Bailey contributed papers on the highlands of New Brunswick and on various forms of caves found along the shores, and in the interior

of the province. At a later time (1910 to 1912) he read a series of three papers on the Diatoms of New Brunswick (these diatoms are microscopic water plants that are the food of fishes etc.).

Mr. Wm. McIntosh at the beginning of the century wrote several articles on insects, with lists of the species occurring in New Brunswick. But since then he has given his attention chiefly to the study of Archæology, on which he has contributed two papers to the Bulletin. We look to him for much useful information in regard to the insects and to a continuation of his exploration of the aboriginal camping grounds of the sunken lake-region in New Brunswick, especially as he is training young people to continue the line of investigation he has begun.

To one of our honorary members, Professor W. F. Ganong we are indebted for more liberal contributions to the Bulletin than to any other member. For twenty years he has devoted his college vacation to the study of the wilderness region of New Brunswick and year after year has given the Society the result of these explorations in a series of papers on the Natural History and Physiography of this his native province. It will no doubt surprise many of our members to learn that over a third of the pages of our annual publication, the Bulletin, during the time I have named, have been from the pen of Professor Ganong. The vast amount of information on the wilder parts of the province gathered by him, have thus been made available to those who wish to know something of the natural resources of our wilderness country.

For actual workers on the natural history of New Brunswick, who are also contributors to the pages of the Bulletin, we seem to be reduced to two, viz Mr. McIntosh and Professor Ganong and it would appear that we should broaden out our work to cover a wider field. From the success which has attended the work of the Associate branch, it would seem that there might be much advantage in this. Their more important work consists largely in a series of literary and historical lectures. Even the central organiza-

tion of the Society has not confined itself to the natural sciences alone, but has extended its activities into the domain of history and literature.

In the former there is a large home field where the Society could do useful work, and I would suggest the advantage of effecting a combination with the Historical Society, by inviting this Society to become an affiliated branch, or otherwise to unite the work of the two societies. Our Society already has in its museum considerable material of the French and early English periods, as well as an excellent collection showing the arts and methods of life of the aborigines, the so-called "Indians." Our building would also be the natural home of those who are pursuing investigations into the early history of the province.

As our museum contains a very large collection of objects showing the early condition of man in this country (where however we have no traces of the earlier remains of Palæolithic man, so well shown in the cave deposits and river-gravels of Europe), I have thought it well to say a few words about late discoveries in the old world in relation to this subject.

Not the least notable in the additions to our knowledge in the past two decades are those that relate to primeval man. We had known that man's history in Europe went back to the Pleistocene or Glacial time, but there was no assured knowledge that would tell us of an earlier time when man contended for his existence and food with animals now extinct. Although the remains of man had been found in a cave in England over-run with boulder clay of the Glacial time, its significance did not seem to be appreciated.

We had indeed learned that there had been a time when man in Europe fashioned tools and weapons of bronze, which was preceded by a time when he made tools and weapons of ground and polished stone. It was also ascertained that the men of the bronze age apparently were fire worshippers and burned their dead. This practice of cremation left no skeletal remains.

Abundant remains of their predecessors of the Neolithic or polished stone age were known, and these compare very closely with those left by the native tribes of the eastern part of the North American continent, which thus would seem to have been in the same stage of culture as these Stone-age men, when Europeans discovered them.

But artifacts found in Europe and elsewhere show that races of mankind occupied the great continent for an immensely long anterior period, and have left us remains of their weapons and tools, and even skeletal remains. The stone weapons and tools are invariably of flaked or chipped stone and show no trace of the grinding processes used by the later races of mankind.

The work of these men of the Paleolithic or chipped-stone age has been admirably summed up by Professor McCurdy of Harvard in his account of discoveries in Europe in the decade from 1900 to 1910. We now know that the discovery of human remains in a cave in England, covered by boulder clay to which I referred above is fully paralleled in antiquity by remains of man in interglacial deposits far up in the German Alps, as well as in the old river gravels of Wertemberg; so it would appear that man lived in Europe, not only at the close of the glacial age, but through a large part of that period, if not from its beginning.

Perhaps the most striking examples of the culture of these early people are the drawings and colored pictures left by them on the walls of caverns in the south of France and north of Spain. Those of France are veritable art galleries and in one well known instance do not begin at the mouth of the cavern but some distance in from the entrance, as though the artist wished to protect them from the hands of the despoiler. But pictographs upon the walls of the Spanish caves, made by the same, or a similar people, bring before us in a very vivid manner hunting scenes of that early time and show us the animals of the chase that fell to the weapons of these ancient hunters. A favourite theme with the artist of this ancient time was the European

Bison, which is represented as possessing enormous shoulders, more bizarre in their size than those of his American cousin' now nearly extinct.

The so-called Heidelberg man—a human lower jaw bone—found in an old gravel bed in one of the German river valleys, is the oldest relic of man's skeleton that has so far been found in Europe, and is claimed to show by its form, a more ape-like moulding of the jaw than any now found in the human species. From this and other evidence from the caves of Belgium, remains lately found in England etc., it is claimed that the men of the Palæolithic or early stone age in Europe, were of a lower intellectual standing than the present inhabitants, and as regards their culture, no more advanced than the rudest savages of the present time.

We might revive useful work in this association by extending and broadening the work now carried on by William McIntosh, with occasional help from our Treasurer, that is establishing a summer camp such as was held in the closing twenty years of the last century. The summer camps of that time were participated in by many members of the Society. It was the custom to have evening lectures at these camps, and class work directed by leaders during the day. About the end of the century this method of instruction was taken up in a more formal way by the summer school of science under paid teachers from the universities etc., which supplied more fully the want which our Society had attempted to fill and the holding of summer camps by this Society was discontinued. Now, however, that the summer school of science has become interprovincial, it may be desirable that our Society should resume its abandoned enterprise of summer camps for the members generally.

As I have now been on the managing board of this Society for over half a century, I feel that I should retire and give place to younger men, and finally ere I retire let me remind you again of the two movements which it appears to me would conduce to a more useful future and more prosperous condition of your Society viz;—a broadening of its scope by entering the field of Local history and an expansion of the Summer camp on the lines pursued a quarter of a century ago.

HON. JOHN V. ELLIS.

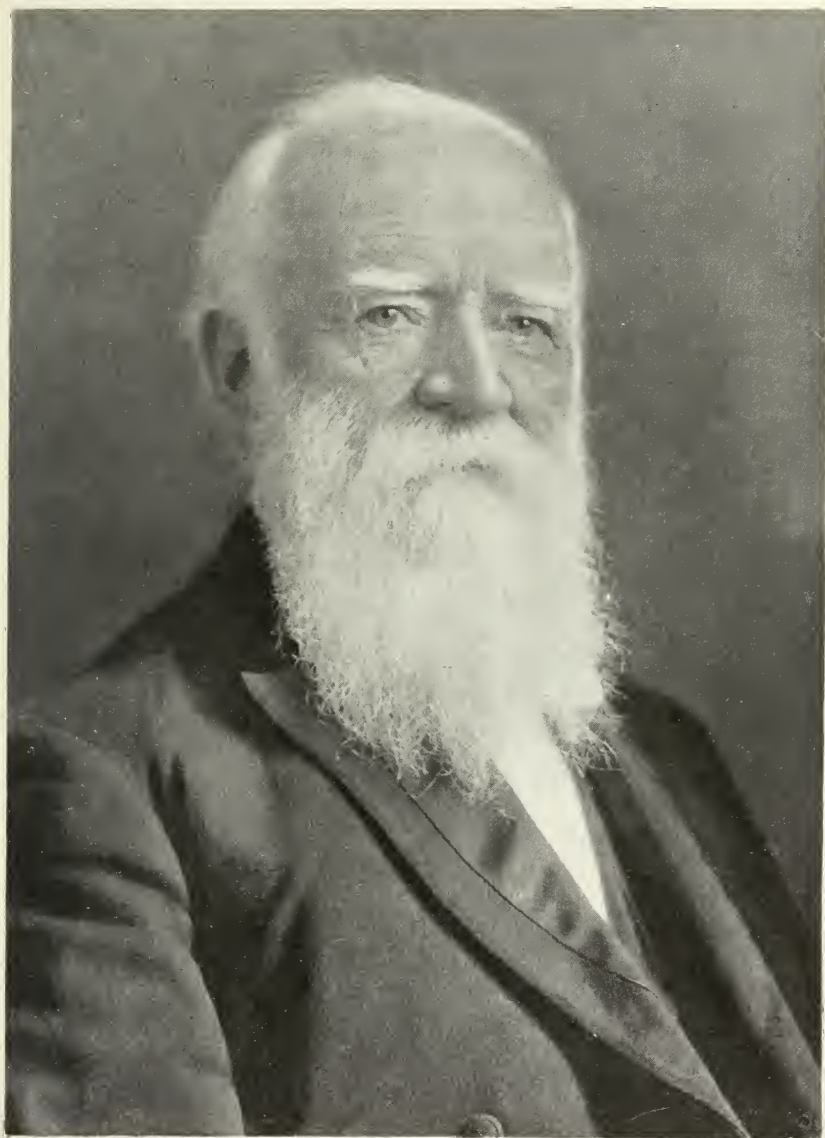
July 10, 1913, will be a day of sad remembrance to the Natural History Society of New Brunswick, as that on which we lost our honored president, Senator John V. Ellis, who, for the past thirteen years, has presided over its formal meetings and other gatherings. Senator Ellis was elected president of the Society in 1901, and from that time forward has occupied the chair at meetings of the Society and of its Council until the close of the last session.

Of our late presidents' public life and literary career more can be learned from other sources, but we are chiefly concerned here with his relation to this Society, of which he was for so many years the presiding officer. It may be said, however, that he was born in Halifax, N. S., and came to St. John as a young man to engage in newspaper work. A pamphlet which he wrote on "New Brunswick a Home for Emigrants," which won a prize offered by the Director of the Mechanic's Institute of St. John, and which abounds with information on the resources and attractions of the province, first drew attention to the young author. Being intended for those seeking a home in this young province, it was written in simple phraseology suitable for the readers for whom it was intended.

Senator Ellis for many years conducted an evening paper published in St. John,—the "Globe"—which was valued for its high moral standing and firm adhesion to principal which its editorials displayed, as well as for its carefully selected news items and correspondence.

The late Senator was well known to the public of St. John. He has represented the city in legislative bodies, was at one time Postmaster of St. John, and, at the close of his life, one of the Senators for New Brunswick in the Federal Legislature at Ottawa.

Senator Ellis was elected president of the Natural History Society of New Brunswick in 1901. At that time the meetings of the Society were held in the City Market building, where the Society had the use of several rooms, granted them by the City Council. It was during the presidency of Senator Ellis



HON JOHN V. ELLIS, LL. D.

that the Society purchased the valuable fire-proof building which they now occupy on Union Street. This was made possible by a large legacy left by a former president, Dr. LeB. Botsford, and the purchase was secured by another large legacy left by Mrs. Gilbert Murdoch. Thus before his death Senator Ellis had the satisfaction of seeing the Society on a more stable basis and in a more prosperous condition than when he assumed the presidency.

Senator Ellis was a man of broad literary culture and of general scientific knowledge, as may be gathered from the addresses delivered by him at several annual meetings of the Society. These will be found in the Annual Bulletins of the Society, published between 1902 and 1909. He was largely instrumental in urging public measures advocated by the Society, as for instance the Act for the establishment of a Public Park, or reserved forest area, on the headwaters of the St. John and other rivers in the northern part of the province. The Society interested itself in having this Act passed,—a very necessary one, for protecting the sources of the water-supply to the most important rivers of the province. But the Act cannot become operative until the Provincial Government defines the bounds of this park, or reserve. In the year following the passage of this Act, Senator Ellis, in his paper and elsewhere, urged the defining by the government of the limits of this reserved area.

A particular interest was taken by Senator Ellis and the members of his family in the summer outings, or Field Meetings, of the Society, which were held during the Society's vacation in the summer. It was the habit of the president to take charge of one of these meetings each year, and they were made very instructive and enjoyable functions. These Field Meetings afforded unusual opportunities for Nature Study, and for acquiring an extended knowledge of the attractive natural features of the vicinity of St. John.

The following resolution was adopted at the Council meeting after the president's death and voiced, however inadequately, the Society's appreciation of the loss they have sustained in their late president's death.

Whereas, in the Providence of God, the Honourable John V. Ellis, LL. D., Senator, President of the Natural History Society of New Brunswick, has been called to rest, resolved, that the following minute be adopted:

The services rendered to the Natural History Society of New Brunswick by the late Senator Ellis for many years, and especially during the last twelve years while he was the honored President of the Society, can hardly be overestimated. He not only presided with combined dignity and urbanity at every meeting that it was possible for him to attend, but his sound judgment and advice were ever at the service of the Society, and its present satisfactory position may be attributed in large measure to the wisdom and prudence exercised by our late President in directing its affairs. Not only so, but his influential position in the councils of the nation, and as a publicist, enabled him in many ways to serve the interests of this Society, for whose welfare and progress he was at all times solicitous.

While our late President made no claim to authority in any particular branch of natural science, he manifested a keen interest in the general progress and discoveries of scientific research, and his criticism of scientific works and essays which usually formed the subject of his annual addresses, manifested that fine perception, that insight and appreciation, which are the gift of ripe scholarship.

While thus giving expression to our sense of the loss which our Society has sustained, we cannot but be mindful of the much greater loss which the death of our late President has brought upon Mrs. Ellis and all those who were near and dear to him and of whose very life he formed an almost inseparable part. To them in their sore bereavement we desire to express our very kind regards and heartfelt sympathy; and

Further resolved, that the Secretary be requested to send to Mrs. Ellis a copy of this minute, conveying to her and others of her household the most sincere sympathy of every member of the Council of the Natural History Society of New Brunswick.



G. U. HAY, Ph. D.

George A. Hay, Ph.D.

Dr. Hay was for many years an active member of the Natural History Society, serving on the board of management in various offices. For a number of years he was president of the Association and since then has served as vice president, filling the position with much acceptability and holding it at the time of his death.

After Rev. Jas. Fowler's removal from St. John to take the chair of Botany in Queen's University, Kingston, Ont., Dr. Hay remained as our leading local botanist and devoted his spare time to the study of the New Brunswick flora, making excursions to various parts of the province. A resumé of the scientific work of Dr. Hay will be prepared and offered for publication in the next Bulletin.

Henry G. Addy, M.D.

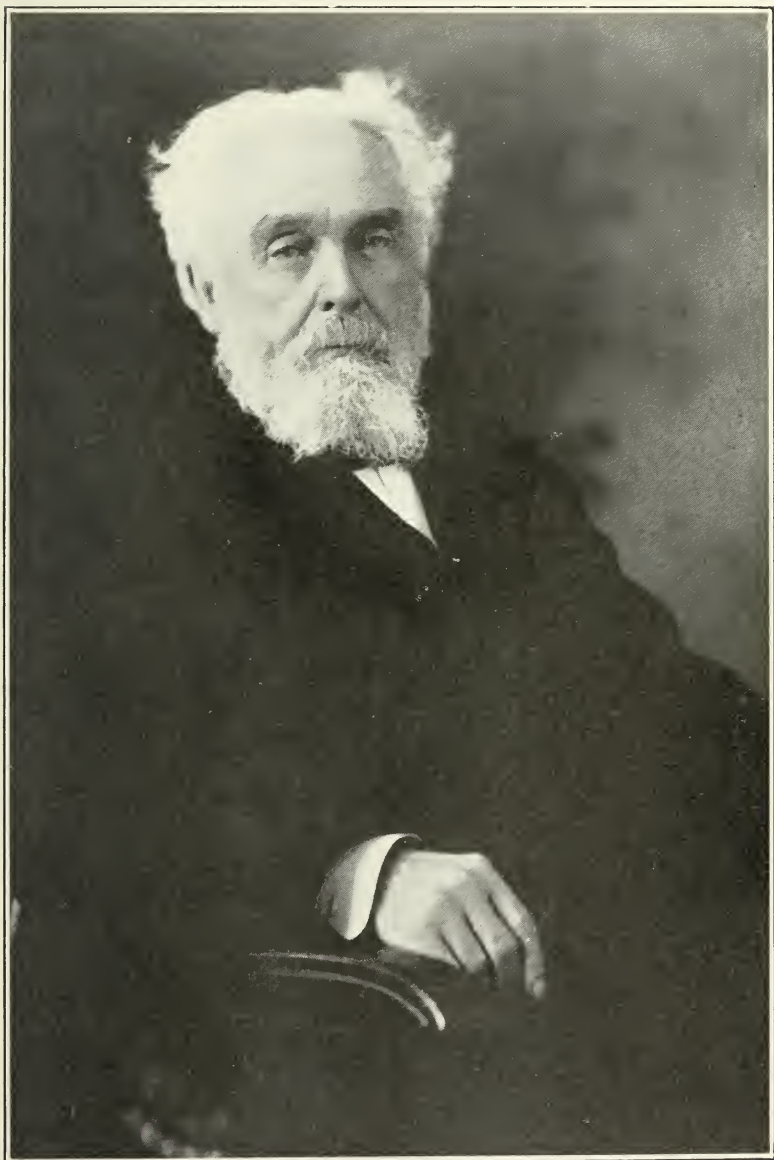
Since the reorganization of the Natural History Society of New Brunswick, some thirty years ago, the late Dr. H. G. Addy has taken a very active interest in its affairs.

For many years he has been a member of its Council, filling important offices in that body, and for a time was its president.

Before coming to St. John, Dr. Addy was for a while a practising physician in Newfoundland, at Conception Bay in that colony. Subsequently he was a surgeon on the staff of the Northern Army during the Civil War.

On coming to St. John he opened an office for the practice of medicine, and, for many years was a leading physician in that city, continuing there until the time of his death on the twenty-eighth of March in the past year (1913).

Dr. Addy was a regular attendant at the meetings of the Society and contributed a paper to the Bulletin of the Society on the "Red Indians of Newfoundland." He occupied the President's chair in 1900.



HENRY G. ADDY, M. D.

THE FIFTY-FIRST ANNUAL REPORT
OF THE
Council of the Natural History Society
OF
NEW BRUNSWICK.

The Council of the Natural History Society of New Brunswick beg leave to submit the following as a part of the work done by the Society for the year ending September 30, 1913.

MEMBERSHIP.

It is very gratifying to the members of the Council to report to this meeting the continuance of their interest taken by the citizens of St. John, in the advancement of the aims and objects of the Society.

The following table shows the number, classes and total enrolled membership:

Benefactors.....	2
Honorary.....	3
Life.....	18
Corresponding.....	18
Regular.....	138
Associate.....	364
Junior.....	17
Junior Associate.....	44
<hr/>	
Total.....	604

TREASURER'S REPORT.

The statements submitted herewith, show the receipts and expenditures for the years 1912-13, and also the Society's financial position on the first of October in the latter year.

It will be noticed that while our membership fees are \$11.00 less than last year, the grant from the City of St. John is \$100.00 more, and also that James Manchester, Esq., has contributed the handsome sum of \$250.00 to our funds.

While we fully appreciate the money value of this gift, we will, I think, more fully value the fact that a citizen of Mr. Manchester's prominence should take such interest in our Society and it would not seem out-of-place to here express the hope that other of our citizens may decide to follow Mr. Manchester's example.

A Society such as ours is not at all likely ever to have at its disposal more money than it can use to good advantage, funds will never be hoarded but the more money available, the more will the museum be improved and the more valuable will it be as an educator.

Our available funds, at the close of the year, were as follows, \$469.52 in regular, and \$2,028.53 in special account, both in the Bank of Nova Scotia, a total of \$2,498.05. Last year the total was \$2,851.47 a shrinkage of \$353.42, notwithstanding the extra \$100.00 from the City, the \$250.00 from Mr. Manchester and the \$300.00 from the estate of our late President.

There has been no increase in salaries, the high cost of everything has played some part, and the payments have included two year's water rates, quite an amount for coal used the previous year, and the sum of \$473.00 for new cases, while the bulletin cost over \$241.00, against \$185.00 in round figures, last year.

Our thanks are due the Provincial Government, and the City of St. John, for the grants of \$400.00, and \$350.00 respectively, to James Manchester, Esq., for his donation of \$250.00, and to the Executor of the estate of our late President for the promptness with which he handed us the amount bequeathed to us.

The amount received from the Fire Insurance Companies, proved a few dollars more than that required to make good the damage caused by the small fire which took place in the library.

A. GORDON LEAVITT, *Treasurer.*

STATEMENT FOR YEAR OCTOBER 1, 1912, TO SEPTEMBER 30, 1913.

RECEIPTS —

Balance in Bank of N. B., Oct. 1, 1912.....		\$84 13
Regular Fees.....	269 00	
Associate Fees.....	318 00	
Junior Fees.....	2 00	
Junior Associate.....	32 00	
	<hr/>	621 00
Grant from N. B. Government.....	400 00	
Grant from City of St. John.....	350 00	
Rent of Rooms.....	12 00	
Old Doors sold.....	14 00	
Withdrawals from Special Account.....	807 62	
Loans from Special Account.....	350 00	
Donation, James Manchester, Esq.....	250 00	
Donation, Estate Hon. J. V. Ellis.....	300 00	
From City of St. John, Expense Geological Congress.....	170 23	
From Fire Insurance Companies, (loss on Bldg.).....	129 70	
	<hr/>	\$3,488 68

EXPENDITURE —

Salaries.....	\$774 88
Repairs and Alterations.....	266 35
Postage.....	38 40
Cleaning.....	42 25
Fuel.....	200 73
Water Rates (2 years).....	56 00
Commission on Collections(fees).....	56 00
Insurance Premiums.....	57 00
Stationery.....	34 75
Telephone.....	40 00
Lights and Lighting.....	57 61
Sundries.....	92 16

Carried forward..... \$1,716 13 \$3,488 68

<i>Brought forward</i>	\$1,716 13	\$3,488 68
Cartage	8 95	
Bulletin XXX	215 00	
Plates for XXX	26 35	
Expense re Visiting Lecturers	18 21	
Expense Geological Congress	170 23	
Gold Sign on Doors	25 00	
Advertising	15 34	
Returned to Special Account	350 00	
New Cases	473 25	
Balance in Bank of Nova Scotia	469 52	
	<hr/>	\$3,488 68

SPECIAL ACCOUNT.

Balance in Bank of N. B. Oct. 1, 1912	\$2767 34	
Interest Dec. 31, 1912,	38.11	
Interest June 30, 1913,	30.70	
	<hr/>	68 81
Loans Returned	350 00	
	<hr/>	\$3,186 15
Withdrawals during year	\$807 62	
Loans to Regular Account	350 00	
Balance in Bank of Nova Scotia	2,028 53	
	<hr/>	\$3,186 15

A. GORDON LEAVITT, *Treasurer.*

Examined and found Correct.

(Signed)	TIMOTHY O'BRIEN,	}	<i>Auditors.</i>
	T. B. BELYEA.		

CURATOR'S REPORT.

GENTLEMEN:

I have the honour to present to you a report of the operations of this Museum for the year ending September 30, 1913.

The general condition of the Museum shows a great improvement over last year, though it still lacks very much in arrangement and labelling of reaching the ideal we have in mind.

During the year, a number of new cases have been obtained, affording about ninety square yards of surface for the installation of exhibits. These cases add greatly to the appearance of the Museum. In anticipation of the visit of the members of the International Geological Congress to this city, it was thought desirable to arrange a series of cases, illustrating the geology and paleontology of New Brunswick. This necessitated the storage of a number of exhibits and the arrangement of geological material in their place. These in turn had to be removed and the original installation replaced.

Visitors.—The use of the Museum by the public during the year had been gratifying. We have had upwards of 5,000 visitors to the Museum. Among these were a great number of scientists and specialists, some of whom came to St. John for the purpose of examining our collections.

Donations.—The Museum has received a large number of accessions by gift, ranging from a single specimen to collections of considerable size. These gifts have been a source of pleasure not alone because of their scientific or intrinsic value, but because they show that the public is interested in our work. A list of the donations will be found elsewhere in this report.

Zoology.—Very little change has been made in this department. Mr. Howard McAdam presented a large number of valuable mounted birds. Several of these are species which were lacking in the Society's collection. A number of mounted specimens of the food and game fishes of New Brunswick have been arranged in the cases which formerly con-

tained the collection of fossils. This collection has been supplemented with coloured plates and additional material will be added during the coming year.

Botany.—The foreign botanical collection, including upwards of 3,000 specimens has been re-arranged and catalogued. About 137 plants were added to the New Brunswick collection, and many specimens were given away and loaned to teachers and pupils.

Minerals and Rocks.—The most important accessions to this department during the year were: The collection of ores and minerals presented by Mrs. F. A. Jones. In this collection were many valuable ores of the precious metals, polished agates, and unusually fine mineral specimens. The collection of local rocks and minerals collected and presented by Mr. Hayes and members of the Geological Survey staff who have been working in the vicinity of St. John during the past summer. Mr. Geo. Scott gave some fine examples of native silver, silver and cobalt ores, etc. Other important gifts were received in this department.

A collection of 150 specimens of the ores of the common metals was placed on exhibition. A series of new wall cases have been installed in this department. In a number of these cases are arranged a collection of the economic minerals of New Brunswick, including the metallic ores, coal, peat, graphite, natural gas, oil and oil shale, lime and dolomite, gypsum, granites, freestones, clays and miscellaneous mineral products. In this collection, are shown the specimens as taken from the mine or quarry, the manufactured products and photographs of the mines and manufacturing plants.

Paleontology.—A large number of fossils have been collected during the year and added to those awaiting critical study. The exhibition collection of fossils has been moved to the long room on the west side of the building and placed in new cases. By this arrangement, all the geological material and fossils are shown in one room.

Archaeology and Ethnology.—During the year, new cases have been obtained for this department and in them the New

Brunswick Indian material, consisting of stone Age Relics, porcupine quill work, bead-work, basketry, and Indian games have been arranged.

Educational Work.—For the past two or three years, we have been loaning to the teachers of the city schools, birds, minerals, plants, and other scientific material with lessons to accompany them. Last year, forty-one specimens were loaned to city teachers, but the demand has quite outgrown our supply.

A great number of specimens and nature lessons have been supplied to schools in various parts of the province, and over 1740 specimens have been named for teachers and others.

The Curator has given a number of talks in the city schools during the year. There is a great demand for the extension of this work in the schools, but a multitude of duties in the Museum makes it impossible to supply all the lessons and material asked for, or to accede to all the requests to give nature talks in the schools.

LECTURE COMMITTEE (W. McINTOSH, *Chairman.*)

The loss which this committee has suffered by the death of Dr. Geo. U. Hay, and Dr. H. G. Addy is well nigh irreparable.

For the past twenty-two years, Dr. Hay has been the chairman of this committee and the success which has attended the lectures given before this Society during almost a quarter of a century, was largely due to the untiring zeal of the chairman. It will be almost impossible to find a successor so well suited as he for this department.

Dr. Addy was a member of this committee for many years. His amiable qualities, sympathetic interest in everything pertaining to the Society and his considerate disposition won for him the respect and affection of those associated with him.

Ten regular meetings of the Society were held during the year, including the Annual meeting. In November, the Society had a gathering to celebrate its fiftieth anniversary.

REGULAR MEETINGS, 1912-1913

- Oct. 1— Results of Summer Outings, G. F. Matthew, LL.D.
 Oct. 15— Annual Meeting. Presentation of Yearly Report.
 Nov. 5— Foraminifera, Radiolaria and Sponges (with Illustrations)—
 L. W. Bailey, LL.D.
 Nov. 12— Celebration of Fiftieth Anniversary.
 Dec. 3— Insect Parasitism — In Special Relation to the Control of the
 Bowntail Moth — John D. Tothill (In charge of Dominion
 Experiment Station, Fredericton).
 1913— FIFTY YEARS PROGRESS IN:
 Jan. 7— Geology — G. F. Matthew, LL.D.
 Feb. 4— Botany — G. U. Hay, D.Sc.
 Mar. 4— Archaeology — Wm. McIntosh.
 April 1— Ornithology — A. Gordon Leavitt.
 May 6— Medicine — T. D. Walker, M.D.
 June 3— Physiology of New Brunswick — W. F. Ganong, Ph.D.

A course of popular lectures was given during the winter, on Tuesday evenings, not occupied by the regular meetings of the Society, these were free to the public.

SPECIAL LECTURE COURSE, 1913.

1913 Tuesday, 8. 00 p. m.

- Jan. 14— The Buried Cities of Sicily — Rev. R. A. Armstrong.
 Jan. 21 — The Story of Lumbering on the St. John River; Its Past, Present
 and Future, J. Fraser Gregory, Esq.
 Jan. 28— Natural Gas: Its Development and Possibilities — J. A. S.
 Henderson, Esq.
 Feb. 11— The Iron Industry — Charles McDonald, Esq.
 Feb. 18— Aerial Navigation and Its Possibilities — W. R. Turnbull, Esq.
 Feb. 25— Pulp and Paper — Senator N. M. Jones.
 Mar. 11— Nature and Art in the Modern City — W. F. Burditt, Esq.
 Mar. 18— The Water Supply of St. John — Wm. Murdoch, Esq., C.E.
 Mar. 25— Electricity: The Incandescent Lamp — Professor Claude S.
 McGinnis.
 April 8— The Food Fishes of New Brunswick — Wm. M. McLean, Esq.

GEOLOGICAL COMMITTEE.

The most notable event, during the past year of interest to geologists was the visit of A.1, or Maritime excursion of the International Geological Congress, which held its session in

Canada this year. The Maritime excursion was in advance of the meeting of Congress, which assembled in Toronto a week later. The excursion spent only one day in St. John, but this was enlivened by a visit to Rockwood Park in the morning and a trip across the city in the afternoon, to the "Falls" and on to the "Bay Shore" and Duck Cove, where refreshments were served to the visiting guests.

At the park these visitors were enabled to see the typical rocks of the Cambrian and pre-Cambrian ages that are exposed there. They spent some time in collecting fossils of Cambrian age from the well-known exposures on Seely street. Afterward they drove across the Cambrian Basin in the city of St. John noting the three sharply folded synclinal troughs which the Basin contains.

Subsequently these geologists were enabled to gather from the sandstones and shales at the "Fern Ledges" and Duck Cove, remains of the very old plants which these beds contain, whose exact age still a matter of controversy.

In the evening a reception was tendered the visitors at the rooms of the Society by the ladies of the Associate Branch, and the visitors were enabled to see the geological and other collections in the Society's Museum.

ARCHAEOLOGY (W. McINTOSH, *Chairman.*)

Considerable Archaeological work has been carried on in New Brunswick during the past year. In June, Harlan I. Smith, Dominion Archaeologist, visited the Maritime Provinces and examined the archaeological collections in New Brunswick and Nova Scotian Museums. He also looked into the possibilities for archaeological research in eastern Canada. Later, Mr. Wintemberg of the Dominion Archaeological Staff examined a number of Indian village and camp sites on the east coast and spent some weeks working in prehistoric camp sites in Nova Scotia.

Your Curator, accompanied by a number of the junior members, visited sixteen ancient village and camp sites during the summer. This collecting trip was very successful, many

valuable specimens being obtained. On this trip we had the pleasure of meetings Messrs. David Balmain and Duncan London. In past years, these gentlemen have given a large amount of stone age material to the Museum, and a reference to the list of this year's donations will show that they have again contributed liberally to our collection. Among the noteworthy articles obtained from Mr. Balmain was part of a drilled stone, probably a pendant, and a very fine gouge with two protuberances on the back. This is the only example of this type of gouge in our collection.

Mr. London presented a large number of objects of which some are of more than usual interest. One of these is a very large, plummet-shaped sinker, $3\frac{1}{4} \times 6\frac{1}{4}$ inches, being at least six times heavier than any other plummet in the Museum. Mr. London also gave some fine axes and flaked blades.

Miss Norma M. L. Fenton, one of our junior members, found a beautiful example of a notched, barbed and stemmed arrow-head. This is the first arrow-head of this type to be added to our collection.

Other specimens were obtained which are unique and worthy of mention, did space permit. Altogether there have been added to the collection this season, 239 New Brunswick stone age implements and many hundreds of pottery fragments.

LIBRARY (JAMES A. ESTEY, *Librarian.*)

As described in last year's report, the library was transferred to the third floor, and the books systematically arranged, only such works as are constantly required for reference being kept in the book-cases in the office.

A large number of valuable books have been presented to the library during the year, and the thanks of the Society are due the donors whose names with a list of their gifts will be found elsewhere in this report.

This Society exchanges publications with 183 institutions in twenty-one countries, namely: Australia, 4; Austria, 1; Belgium, 1; Brazil, 1; Canada, 52; Chili, 1; England, 11; France 3; Ireland, 1; Italy, 1; Mexico, 1; New Zealand, 3;

Peru, 1; Philippine Islands, 1; Portugal, 1; Russia, 2; Scotland, 1; Spain, 1; Sweden, 2; United States, 93; Uruguay, 1.

The following names have been added to the exchange list during the past year:

American Geographical Society.

Board of School Trustees of the City of St. John.

Canadian Department of Interior, Forestry Branch.

Canadian Marine Biological Stations.

Deseret Museum.

Illinois State Museum of Natural History.

International Agricultural Institute.

Louisiana State Museum.

Maine Agricultural Experiment Station.

New Brunswick Agricultural Report.

Oakland Public Museum.

Ontario Department of Agriculture.

Philadelphia Commercial Museum.

Texas Academy of Science.

United States Bureau of Biological Survey.

University of Missouri.

Washington University.

The library contains about 13,460 books and pamphlets.

BUILDING COMMITTEE (T. H. ESTABROOKS, *Chairman.*)

The most important matter which your committee has to report is the fire which caused some damage to the office and the room below. It has been customary during the spring and fall to have a fire in the grate in the office. This spring, while the grate was in use, smoke was noticed in the building and upon investigation it was found that the wood-work beneath the grate was smouldering, and a still alarm was sent in. When the firemen removed the marble slab beneath the grate, it was found to be resting directly on the wood-work, in other words, there was only $1\frac{1}{4}$ inches of marble between the fire and the floor beneath. Surprise was expressed that a fire had not occurred here years ago. Considerable damage was done

by removing the fireplace and cutting up the floor. This caused a section of the ceiling in the room below to fall. The damage was repaired and the fire-place properly replaced, the insurance covering the expense.

Some of the cement coating had fallen from the south wall of the building this had to be replaced. Gilt lettering was placed on the front doors, giving the name of the Museum and the hours at which it is open to the public.

COMMITTEE ON PUBLICATIONS.

An annual bulletin of the Society was published at the beginning of this year and contains articles by Professors L. W. Bailey, W. F. Ganong and others. Dr. Bailey's article deals with the diatoms of the Gulf of St. Lawrence and its tributary rivers. There are numerous lists of species with remarks on their habits and distribution.

Professor Ganong adds to his numerous contributions, to the *Physiography of New Brunswick*, by several in this bulletin, treating chiefly of the Gaspereau and Salmon rivers in Queens and Sunbury counties. Mr. D. L. Hutchinson has written and presented his summary and tables of the weather conditions in New Brunswick for 1911.

The late Dr. G. U. Hay has written for this bulletin an account of the fiftieth anniversary of the Society, which ends with a highly appreciative letter from one of the life members speaking of the high standing of the Society, and of its valuable contributions to scientific knowledge. At this anniversary meeting, portraits of a number of prominent members were unveiled and presented to the Society. The anniversary celebration was participated in by the Lieut. Governor of the province, the Mayor and many prominent citizens.

The popularity of the Society is further shown by the list of donations to the Museum and library and by the long list of members of different classes, about six hundred and eighty in number, who form its active supporters.

REPORT OF THE LADIES' ASSOCIATION OF THE NATURAL HISTORY SOCIETY.

The past season was an important one in our history as we completed then the fiftieth year of the existence of the Natural History Society and the twenty-fifth of the existence of The Ladies' Association's connection with it, as a definite factor in its life work.

Since the Jubilee celebration, held in October last, three of the Presidents whose portraits presented by our Ladies Association were then unveiled have passed from our midst to a higher sphere, where "the Master of all good workmen has set them to work anew." How great the loss to all of us, it would be difficult, nay impossible, to express; but the sense of loss will surely not deaden our energies but rather spur us on to carry forward to the best of our ability, the work in which they were so deeply interested.

An event of great interest to us all was the visit of over sixty members of the International Geological Congress to St. John last July. Our Ladies' Association, as always, did its part bravely in the entertainment of these distinguished visitors. A number of our members accompanied the Scientists on their trip around the city and from Seaside Park along the shore to Duck Cove, where there was a pleasant reunion of members and guests. A few short addresses were given and afternoon tea was served. We all recall with pleasure the reception at the Museum, where some pleasant words of appreciation of our Society and our city were spoken in English, French, German and Japanese. The refreshments were served in the generous and orderly manner for which our Ladies' Association is noted.

Our lecture courses last winter were excellent, and were well attended. The Fall course of paid lectures, (including four on Royal Residences, and two on Modern Opera,) were, we hope, instructive and of educational value. The winter Free Course was varied and interesting.

For this winter's work a "reversion to type" has been considered and the plan of having talks on the objects in the

Museum for our lecture course has been decided upon. The first lecture will be on Egypt, given by Miss E. R. Scovil. There are several Egyptian curios in the Museum, among them some osirids,—How many of us know what an osirid is?—but Miss Scovil will explain that, besides giving us a short sketch of the history of ancient Egypt, and some notes about the latest discoveries in that wonderful country.

The second lecture will be on Buddha by Mrs. C. Fiske. We have some veritable treasures in the Museum in those two large statues of Buddha which were brought to the Gesner Museum seventy-five years ago from an Indian temple in Burmah.

The third lecture is to be on the Dinosaurs, with a short introduction on the Evolution of the Horse, illustrated by casts and photographs, and will be given by Mrs. Geo. F. Matthew. Extracts from an unpublished paper on these huge reptiles, by Dr. W. D. Matthew of the New York Museum will be quoted.

The Fourth Lecture will be on the Pueblo Indians. Mrs. Sayre, a lady, who was sent by the Government of the United States, has for fifteen years lived among and taught these people, has kindly consented to tell us something of their life and habits, and of her personal experiences among them.

All these lectures will be fully illustrated with the reflectoscope, which has been repaired and put in the best possible shape, so that we will no longer hear the noise which former years has been troublesome,

The two closing lectures of this course are to be given by the junior members under the direction of Mr. and Mrs. McIntosh. The lectures will consist of a talk on Prehistoric Acadia in two parts. These talks will be illustrated by lantern slides, tableaux and living pictures by the junior members of the Natural History Society. The talks will describe the manners and customs of the Indians of Acadia in ancient times. The costumes will be historically correct and the music, the ancient Indian chants and songs which have been preserved. In part one, the Social life of the Indians will be described and illustrated; in part two, the arts and industries.

The following is the list of the free afternoon lectures of the course, arranged by the Ladie's Association.

- Jan. 15— "Domestic Science, in relation to the home."—Mrs. E. K. Milligan.
- Jan. 22— "Domestic Science, in relation to the school curriculum."—Miss Kate R. Bartlett.
- Jan. 29 — "Dietetics."—Miss Jessie Church.
- Feb. 3— "Social and Ethical Efficiency, its effect upon the individual—Miss Jean B. Peacock.
- Feb. 12 — "Social and Ethical Efficiency, its effect upon Society."—Mrs. John A. McAvity
- Feb. 19— "Sanitation and Economy, in regard to individual and public Health."— Dr. George G. Melvin.
- Feb. 26— "Our Housing Problem."—W. F. Burditt, Esq.

The new Executive have decided to give three special evenings to entertain the King's Daughters Girls' Association, and the members of the Protestant Orphan Asylum, and the Wiggins Male Orphan Asylum. Some of the lectures in our course will be repeated.

In beginning on our second quarter century of work as an Auxiliary to the Natural History Society of New Brunswick, while we have many sad losses to mourn, we have much to encourage us to renewed effort. We have now 375 members on our list, in good standing, and as our work is pre-eminently educational, I hope and believe that we will all strive to make it more and more successful each year in "drawing out" (as the word means) what is best and noblest in each and every one with whom we in our Association come in contact. Thus will we, in recalling ever our Motto "Progress is the law of life" realize also the poet's words, "Love is life's only sign."

K. M. MATTHEW, *President.*

LADIES ASSOCIATION NATURAL HISTORY SOCIETY.

TREASURER'S REPORT.

1912-13	RECEIPTS.	
Cash in Bank.....		\$65 53
Course tickets receipts.....		100 25
Interest on Bank Deposit.....		2 43
Cash on hand.....		90
		<hr/>
		\$169 11
1912-13	EXPENDITURE.	
Framing picture.....		\$2 25
Coaching.....		1 50
5 yds. Toweling.....		45
Affiliation fee Woman's Local Council.....		2 00
Tuning Piano.....		1 50
Gift to Cor. Sec.....		12 50
Cash in Bank.....		148 91
		<hr/>
		169 11

GRACE WALLACE LEAVITT, Treasurer.

Oct. 14, 1913.

THE JUNIOR ASSOCIATE BRANCH.

Herewith, I submit the annual report of the Junior Associate Branch of the Natural History Society of New Brunswick.

In the past year a number of new members have joined the Branch, there now being forty-four members in good standing.

During the year, many interesting and enjoyable outings were held. These outings were well attended and were chaperoned by Mr. and Mrs. McIntosh. On a number of occasions the girls were the guests of some of the members at their summer homes and these outings were particularly enjoyable. The girls took great interest in finding the different ferns, learning about the trees, and collecting botanical specimens.

The girl's camp this year was larger than usual. There were twenty-five in the party, including Mr. and Mrs. McIntosh and Mr. Leavitt. Three very enjoyable weeks were

spent at Douglas Harbour on Grand Lake, and short trips were taken to nearby points of interest. A number of stone age relics and fragments of Indian pottery were found by the members on some of these excursions. During the trip, Mr. McIntosh gave several talks about the Indians who lived around Grand Lake and told some of their legends.

The past year has been most successful. Never before have the girls taken so much interest in the work of the Society.

Respectfully Submitted,

KATHLEEN R. WALKER,
Secretary for the Junior Associates.

DONATIONS.

ARCHAEOLOGY AND ETHNOLOGY.

- BALMAIN, DAVID — Stone arrowheads, and other implements of the Stone Age (41 specimens).
- CAMPBELL, LLOYD — Indian relics (4 specimens) Fragments of Indian Pottery.
- COSTER, MISS RUTH S. — Stone Arrowhead.
- DESOYRES, MISS — Basket made by natives of Delagoa Bay, Kaffir beadwork and bracelets.
- DUNLOP, MRS. J. D. — Bag made of seeds by the natives of the West Indies.
- DYKEMAN, MELBOURNE — Relics of the New Brunswick Stone Age (21 specimens.)
- FENTON, MISS NORMA M. — Indian Relics (3 specimens.)
- GUNTER, LESLIE E. — Stone Spearhead
- HOLT, F. W. — Moccasins worn by Indians of North Shore of Gulf of St. Lawrence.
- JONES, MRS. F. A. — Mummy's Foot, from Egypt.; Egyptian Osirid; 2 Egyptian Figurines; 2 Scarabs; Kaffir Necklaces and Ornaments; Navajo Bow and Arrows.
- LEAVITT, A. GORDON — Stone Arrowhead; Fragments of Indian Pottery. Figure of Buddha; Birch Bark Box with Porcupine Quill embroidery. Indian Basket-maker's gauge.
- LONDON, DUNCAN — Relics of Stone Age (67 specimens). Prehistoric Pottery.
- LORD, JOHN — The following articles from the Philippine Islands: Earthenware Jar; 3 Filipino hats, as made and worn by Ibaloi; 1 hat, as worn by Mountain Tribes; 2 Head axes; 2 Spears.
- MCINTOSH, WM. — Indian Stone Relics (87 specimens) Indian Pottery.
- MCINTOSH, MRS. WM — Stone Axe.
- TODD, WALTER H. — Indian Relics (3 specimens).
- WILLET, D. GORDON — Implements of the New Brunswick Stone Age (9 specimens) Indian Pottery.

ZOOLOGY.

- BAILEY, DR. L. W. — Marine Sponge.
- CLAYTON, ROY E. — Deer Mouse (mounted).
- DOBBIN, W. L. — Specimens of Saxicava shell.
- FREEZE, MRS. R. J. — Vertebra of Whale.
- FROST, GEO. K. — Giant Water Bug.
- GALLEY, M. W. — Shell of Razor Clam.

- INGRAHAM, EDGAR R.— Tarantula.
 JONES, MRS. F. A.— Rattle of Rattlesnake. Tortoise Shell.
 JONES, PERCY — Ostrich Egg.
 HARDING, MRS. J. S. — Alligator's Egg.
 LEAVITT, A. GORDON — 2581 insects, mostly Hymenoptera; Nest of Weaver Bird; Jakkus Monkey (mounted) Muskrat, (mounted), Bermuda Starfish; Piece of Whalebone.
 MCADAM, HOWARD — Duck; Oldsquaw; 2 Herring Gulls; Leach's Petrel, young; Murre; Barred Owl; Short-eared Owl; Little Green Heron; Curlew; Coot; Gannet, young, American Crossbill; Blue Jay; Partial Albino Ruffed Grouse; Head of Horned Doe.
 MCINTOSH, D— Large specimen of Hen Clam.
 ROGAN, J. F.— Live Tortoise.
 SMITH, H. J.— English Bird Eggs.
 STOCKTON, MRS. A. A.— Mounted Caribou.
 YOUNGHUSBAND, MRS.— Spindle shell, with curious growth of seaweed.

BOTANY.

- HAY, DR. GEO. U.— Specimens of New Brunswick plants.
 HOLT, F. W., C.E.— Specimens of Botrychium ternatum, Wild Oats and Crowberry.
 JONES, MRS. F. A.— Olive Wood, from Jerusalem; Loofa Gourd; Pressed Flowers, from Jerusalem.

PALEONTOLOGY.

- ESTABROOKS, T. H.— Fossil Ammonite, England.
 JONES, J. WILLIS — Fossils from Long Island, Kennebecasis River (103 specimens.)
 LEAVITT, A. GORDON — Large number of Fossils of the St. John group.
 McMULLON, H. J.— Fossilized Wood, from the Petrified Forest, Arizona.
 SCOTT, GEORGE — Fossil Corals, from Lake Timiskaming, Ontario.
 SIMPSON, MRS.— Fossil fern from Inverness, C. B.
 SMITH, H. J.— 2 specimens fossil wood; 1 specimen Fossil ammonite, polished.

MINERALS.

- DESOYRES, Miss— Gold Ore, Rhodesia.
 ESTEY, J. A. — Core from Diamond Drill, Manganese Mines, Markhamville, N. B.
 GEOLOGICAL SURVEY OF CANADA.— 44 specimens or minerals and rocks collected about St. John.
 HOLT, F. W., C.E.— Feldspathic Granite Rock; Leda Clay containing Post-Pleocene shells. Ryolite specimens.
 JONES, MRS. F. A.— A valuable collection of Minerals, including ores of the metals, more particularly gold and silver; Polished Agates, and a large number of very beautiful mineral specimens, about 90 specimens in all.

- LEAVITT, A. GORDON — Limestone showing weathering.
 MARITIME OIL FIELDS, LTD.— Crude Petroleum, Gas Sand, Oil Sand, Albertite.
 MCGRATTAN, H. & SONS.— Specimen of polished black granite.
 MCKINNEY, JOHN — Polished Marble from Marble Cove.
 MCCLAUCHLAN, MRS. CHAS.— 2 specimens of Amethyst; a specimen of Zeolite.
 RANDOLPH AND BAKER — Specimens of Magnesia Rock, Magnesia Lime, Lime Rock and Building Lime.
 SCOTT, GEORGE — Specimens of Native Silver, Silver Ores; Lead and Copper Ores from Cobalt, Ontario
 SMITH, H. J.— Specimen of Obsidian.
 TOTTEN, JAS. L.— 1 specimen of apatite. 2 specimens of Granite with pyrites.

GENERAL.

- BALMAIN, DAVID — Loyalist Powder horn also one used about 75 years ago.
 CAMPBELL, LLOYD — Vickers Maxime or Pom-pom shell.
 CLARKE, PROF. JOHN M.— Iron Axe from the site of Nicholas Denys' House and Fort, near Nepisiguit, N. B.
 FOTHERBY, MISSES — Pair of pattens.
 FROST, GEO. K.— Old German Lock.
 GANONG, PROF. W. F.— Portrait.
 JACK, MISS LOUISE — Post Cards, Chateaux of France.
 JONES, MRS. F. A.— Burro's Shoes; Gold Miner's Candle Holder; The following articles used by Boer soldiers during the war; Leather haversack; water bottle, saddle girth made of horsehair, breechblock of Mauser rifle, Bandages for first aid, soldier's belt with British regimental badges, bandolier, pompom shell, dum dum bullets. The following articles used by British soldiers during the Boer war; Bandolier, emergency kit, water bottle, Kit, Emergency rations. Opium-smoker's outfit; Plate made of McAdamite; Bit of Washington Elm from Cambridge; Glass vase coated with Calcite by being left in Manitou Spring for 24 hours; Turkish Dagger; Carved cup made of stone from the Dead Sea; Pin, said to be over 200 years old; Facsimile of the Death Warrant of Charles I.
 JONES, PERCY — Pictures for Reflectoscope.
 JONES, R. Keltie — Portfolio of reproductions of the water-color paintings of Games Fishes of the United States, by S. A. Kilburn.
 LEAVITT, A. GORDON — Military Water Bottle; Glass Globe; Panoramic views of Halifax, Sydney, Montreal and Toronto.
 Two old cheques, one drawn by Cudlip and Snider on the Bank of British North America, 1859; the other by Pawson & Co., in favor of W. Doherty & Co., dated 1855.
 LEAVITT, MRS. R. T.— Picture of St. John City in 1851.
 MCINTOSH, WM.— Anchor, said to be of French origin.
 RAYMOND, REV. W. O.— Cannon Ball, probably Old English, from the fort opposite Evandale.

- SCOTT, GEORGE — Lease between Conrad J. Hendricks and Samuel Hallett, dated April, 1843; Letter to Thomas McAvity from T. Badger, 1844. Letter to James Clews from Wm. Badger, 1846. Crimping Iron.
- WISHART, ALLISON — Piece of teakwood, part of the keel of one of the French vessels sunk at Louisburg by the English.
- YOUNGHUSBAND, MRS.— Kelp Spoon from California.

LIBRARY.

- ALLISON, MRS. LUCIUS — "Punch" 1843.
- BURTON, WM.— Two old books, one printed in 1754, the other in 1778.
- CARMAN, CHAS. H.— "Ferns, British and Foreign."
- FOTHERBY, MISSES — Copies of "Illustrated London News."
- GANONG, PROF. W. F.— "Science" for 1912.
- GOLDSWORTHY, CAMBRIDGE.— Two old books, one published in 1780, the other in 1784.
- HAY, GEO. U.— Volume of "The Educational Review." "Invertebrate Zoology" Pratt.
- HOLMAN, MRS. A. L.— A number of periodicals, dated from 1835 to 1866.
- KERR, JOHN — 22 numbers of "The New Brunswick Magazine" 30 numbers of "Picturesque America."
- LEAVITT, A. GORDON — A large number of scientific periodicals, Government reports, almanacs, etc.
- LEAVITT, MRS. R. T.— 40 volumes of old works, including 2 vols. of Chambers Cyclopaedia, 1782.
- MATTHEW, DR. G. F.— "The Natural History of the Toronto Region."
- McLAUGHLIN MRS. CHAS.— A large number of newspapers recording historical events.
- RAYMOND, REV. W. O.— 11 books on scientific subjects.
- ROBINSON, MISS ELEANOR.— Gesner's "Geology and Mineralogy of Nova Scotia" with the author's autograph on the fly leaf; two old books, published in 1773. "Homer's Iliad."
- VROOM, JAMES — "Rhodora" vols. 1-13, a few numbers missing.
- WARDROPER, MRS. H. E.— 2 volumes of "Collection of Voyages and Travels" by John Harris, A. M., F. R. S., Printed in London, 1705.

List of Members.

BENEFACTORS.

*LEBARON BOTSFORD, M.D.

*MRS. GILBERT MURDOCH.

PATRON

The Lieutenant-Governor, HON. JOSIAH WOOD.

HONORARY MEMBERS.

BAILEY, PROF. LORING W., PH.D. Fredericton N. B.
 GANONG, PROF. W. F., PH.D. Smith College, Northampton, Mass.
 MARR, PROF. JOHN E. St. John's College, Cambridge, England.

LIFE MEMBERS.

CAMPBELL, J. ROY, St. John, N. B.	LEAVITT, A. GORDON, St. John, N. B.
CHAMBERLAIN, MONTAGUE, Boston Mass.	LEAVITT, MISS GRACE W., St. John, N. B.
EARLE, W. E., St. John, N. B.	LONGMAID, MISS S., St. John, N. B.
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ESTABROOKS, T. H., St. John, N. B.	MATTHEW, MRS. G. F., St. John, N. B.
GANONG, G. W., St. Stephen, N. B.	MATTHEW, ROBT. M.A., Cienfuegos, Cuba.
GANONG, PROF. W. F., PH.D., Northampton Mass.	MCINTOSH, WM., St. John, N. B.
HEGAN, JAS. B., Charlottetown, P. E. I.	WOODMAN, MRS. C. F., St. John, N. B.

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BALMAIN, DAVID, Indian Point, Queens Co., N. B.	MACKAY, DR. A. II. LL.D., Halifax, N. S.
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	WILSON, WILLIAM J., Ottawa, Ont.

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	BOURNE, T. PERCY.	COOPER, REGINALD
BANKS, J. W.	BRODIE, WILLIAM	CORBITT, SAMUEL A.
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*Deceased

- CROSBY, L. G.
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 ELLIS, FRANK B.
 ELLIS, W. L., M.D.
 EMERSON, H. WALTER
 EMERSON, ROBERT B.
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 FRINK, R. W. W.
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 HUTCHINSON, D. LEAVITT
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 INCHES, DR. P. ROBERTSON.
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